NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

COMMAND AND CONTROL ARCHITECTURE FOR RECONNAISSANCE AND COUNTER-RECONNAISSANCE IN THE U.S. ARMY ARMOR AND MECHANIZED INFANTRY TASK FORCE

by

James Bruce Henderson

March 1990

Thesis Advisor: Carl R. Jones

Approved for public release; distribution is unlimited.

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release; distribution is unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION: Naval Postgraduate School; 6b. OFFICE SYMBOL (If applicable): 39	7a. NAME OF MONITORING ORGANIZATION: Naval Postgraduate School
6c. ADDRESS (City, State, and ZIP Code): Monterey, CA 93943-5000	7b. ADDRESS (City, State, and ZIP Code): Monterey, CA 93943-5000
8a. NAME OF FUNDING/SPONSORING ORGANIZATION; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Command and Control Architecture for Reconnaissance and Counterreconnaissance in the U.S. Army Armor and Mechanized Infantry Task Force

12. PERSONAL AUTHOR(S)
James B. Henderson

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Master's Thesis	FROM _____ TO _____	March 1990	133

16. SUPPLEMENTARY NOTATION
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Command and Control, Reconnaissance, Ground Tactical Reconnaissance, Army Task Force, Recon, Counterrecon, Command and Control Architecture, Counterreconnaissance

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The author presents an analysis of reconnaissance and counterreconnaissance missions in the U.S. Army armor and mechanized infantry task force. An introduction to reconnaissance and counterreconnaissance provides background information essential to the analysis of each mission. The impact of information processing within the task force and its effect on mission execution is discussed. A systematic approach to mission, or task, analysis using four task variables (task characteristics, task environment, inter-unit task interdependence, technology) identifies the uncertainty in the task and the subsequent impact on information processing. An analysis of reconnaissance and counterreconnaissance using the four variables reveals the uncertainty in each task and its effect on the information processing capability of the task force. A unique command and control architecture is developed for each task which addresses the uncertainty in the task and facilitates information processing within the task force.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION: Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL: Dr. Carl R. Jones	22b. TELEPHONE (Include Area Code): (408) 646-2772	22c. OFFICE SYMBOL: 74CC

DD Form 1473, JUN 86 — Previous editions are obsolete — SECURITY CLASSIFICATION OF THIS PAGE: Unclassified

Approved for public release; distribution is unlimited.

Command and Control Architecture for Reconnaissance and Counterreconnaissance in the U.S. Army Armor and Mechanized Infantry Task Force

by

James B. Henderson
Captain, United States Army
B.S., United States Military Academy, 1981

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN SYSTEMS TECHNOLOGY
(Command, Control, and Communications)

from the

NAVAL POSTGRADUATE SCHOOL
March 1990

Author: James B. Henderson
James B. Henderson

Approved by:
Carl R. Jones, Thesis Advisor

Victor W. Roeske
Victor Roeske, Second Reader

Carl R. Jones, Chairman,
Command, Control and Communications Academic Group

ABSTRACT

The author presents an analysis of reconnaissance and counter-reconnaissance missions in the U.S. Army armor and mechanized infantry task force. An introduction to reconnaissance and counter-reconnaissance provides background information essential to the analysis of each mission. The impact of information processing within the task force and its effect on mission execution is discussed. A systematic approach to mission, or task, analysis using four task variables (task characteristics, task environment, inter-unit task interdependence, technology) identifies the uncertainty in the task and the subsequent impact on information processing. An analysis of reconnaissance and counterreconnaissance using the four variables reveals the uncertainty in each task and its effect on the information processing capability of the task force. A unique command and control architecture is developed for each task which addresses the uncertainty in the task and facilitates information processing within the task force.

TABLE OF CONTENTS

I. INTRODUCTION

A. BACKGROUND

Throughout the history of warfare, the battlefield commander has gone to great lengths to gather as much information about the enemy as possible. Campaign studies of history's great captains provide the student of military art with a deep appreciation of the need for good reconnaissance. The need for reconnaissance was evident during the battle between the Macedonians and the Persians along the Granicus River in 333 B.C. Good surveillance of the enemy disposition with respect to the surrounding terrain enabled Alexander to defeat an enemy vastly superior in number [Ref. 1:p. 24]. This lesson was not lost on the Duke of Wellington during his campaigns in India and later on the Iberian Peninsula. The British were able to overcome the lack of good maps by using reconnaissance to gather information about the enemy. This led to the defeat of much larger Indian and French forces during each respective campaign [Ref. 1:pp. 135, 146, 153–154]. It was the lack of good reconnaissance, notably the absence of Jeb Stuart's cavalry, that blinded Robert E. Lee during his army's march toward Gettysburg. The corresponding lack of information caused Lee to forfeit the advantage of position, so characteristic of the Confederate Army and its commander, and subsequently experience his most critical defeat of the war [Ref. 2:p. 71].

Reconnaissance, the act of gathering information about enemy intent, disposition, and capabilities, has long been recognized as the key

element in determining success or failure on the battlefield [Ref. 3:p. 304]. United States Army leaders currently learn many of the same lessons about reconnaissance as the great battle captains did. Rotational exercises at the Army's National Training Center (NTC) at Fort Irwin, California, serve as a principal training medium by which army leaders practice and refine the operational principles of tactical warfare. Perhaps the most glaring lesson that many leaders learn from this outstanding experience is the importance of reconnaissance to mission accomplishment. Exercise studies consistently show that effective reconnaissance generally results in mission success, while inadequate reconnaissance almost always assures failure [Ref. 4:p. 12]. The most prominent trend of these studies is the inability of the armor and mechanized infantry task force scout platoon, as it is currently structured, to accomplish the tasks inherent in reconnaissance. Much of the blame for the scout platoon's poor performance is based on inadequate organization, equipment, and training [Ref. 4:pp. 3, 67].

Recognizing the need to improve the reconnaissance capability in the armor and mechanized infantry task force, the United States Army Armor School (USAARMS) has recommended several equipment and organizational changes to the task force scout platoon. Two candidate organizations for the task force scout platoon were studied during unit rotational training at the NTC in August 1988. Subsequent analysis of the data from these exercises may very well determine the ultimate organizational structure of the scout platoon in the armor and mechanized infantry task force well into the next century. [Ref. 5:pp. 1, 8]

While restructuring the scout platoon helps to ease the burden it assumes during the reconnaissance mission, it does not serve as the ultimate cure for the problems that plague units at the NTC in the area of reconnaissance. A commander can essentially assign as many elements of the task force to execute the reconnaissance mission as he sees fit. This, of course, leads to the problem of balancing the need for information with the ability of the task force to employ effective combat power against the enemy.

The past five years have also seen the advent of counterreconnaissance in the task force. Counterreconnaissance is essentially the aggregation of task force actions to deny the enemy information concerning task force intentions, strength, and location [Ref. 3:p. 94]. Employing additional combat forces to supplement the intelligence-gathering capabilities of the scout platoon seems to be the accepted norm at the NTC when dealing with the enemy reconnaissance effort [Ref. 6:p. 10]. This again poses problems to the task force commander as he attempts to determine the trade-offs between defeating the enemy reconnaissance forces and maintaining combat strength in the task force Main Battle Area (MBA).

B. SYNOPSIS

It is unlikely that successful reconnaissance or counterreconnaissance is dependent upon the organization of the scout platoon. Reconnaissance consists of multiple subtasks, each requiring a unique structure of personnel, equipment, and command and control coordinating mechanisms. Counterreconnaissance is inherently less complex than

reconnaissance due to the small number of subtasks that the commander and staff must consider. The low degree of complexity enables the commander and staff to standardize the organizational structure and procedures of the task force elements as well as coordinating mechanisms that are essential to counterreconnaissance. The distinctions between reconnaissance and counterreconnaissance have a significant impact on how the commander and staff plan and supervise the actions of the task force for each specific mission.

The need to gather and process information in some quantity, however, is a principle that is common to both reconnaissance and counterreconnaissance. By viewing the task force organization as an information processing system, the task force commander can analyze reconnaissance and counterreconnaissance in terms of the uncertainty that each represents to the information-processing capability of the unit. The commander's analysis provides the methodology for determining which task force elements and coordinating mechanisms are appropriate for conducting reconnaissance and counterreconnaissance. The process of matching the elements and coordinating mechanisms to mission or task uncertainty requires the commander to assume a systematic approach to structuring the command and control architecture of the task force.

C. PURPOSE

The primary purpose of this thesis is to provide its readers with a systematic approach toward organizational command and control structural design. The thesis uses a generic U.S. Army armor and mechanized infantry task force (a battalion-level force composed of tanks and

mechanized infantry) as a tool for presenting two examples of command and control architecture—one for reconnaissance and the other for counterreconnaissance. The author presents the principles of task analysis that are used in determining the degree and type of uncertainty in a given task or mission. The author also provides several coordinating mechanisms and organizational elements used within a command and control structure to minimize the uncertainty associated with the task and facilitate information processing. The author then justifies the choice of coordinating mechanisms and task force elements (essentially the command and control structure) necessary to conduct reconnaissance and counterreconnaissance using the principles presented in the thesis.

D. PRESENTATION SEQUENCE

The thesis contains six chapters of variable length and scope. Each subsequent chapter is meant to build on the information provided in the previous chapters.

1. Chapter I

Chapter I contains the thesis introduction, a synopsis of the reconnaissance and counterreconnaissance problem that a task force commander must understand and resolve, the purpose of the thesis, and the presentation sequence of the thesis.

2. Chapter II

The second chapter provides the reader with the background information on reconnaissance and counterreconnaissance that is needed to understand the discussion in the chapters that follow. Chapter II begins with three historical examples that present the importance of

good reconnaissance and counterreconnaissance to the battlefield commander. The chapter also presents detailed information on the principles, fundamentals, and techniques that constitute reconnaissance. Similar information is provided on counterreconnaissance tasks and techniques. The chapter then provides discussion of the Intelligence Preparation of the Battlefield (IPB), resources available to the commander to conduct reconnaissance and counterreconnaissance in the armor and mechanized infantry task force, and a detailed description of the task force scout platoon organization and capabilities.

3. Chapter III

Chapter III provides the principles that are essential when conducting analysis of a given mission or task. This chapter presents the command and control structure of the armor and mechanized infantry task force as an information processing system that gathers raw data, processes it into useable information, and provides the information to the commander so that he may effectively direct the combat power of the task force against an enemy. The task analysis provides a methodology for identifying and resolving task uncertainty that might exist in the information processing structure of the task force as the unit executes a particular mission or task.

4. Chapter IV

Chapter IV contains information on the coordinating mechanisms and organizational elements of design within the task force that make up the command and control architecture of the unit. A task analysis of the reconnaissance task establishes the degree of associated

uncertainty which the commander must reduce through an effective command and control structure. The chapter then presents a command and control structure for reconnaissance that alleviates task-related uncertainty using the coordinating mechanisms and design elements provided earlier in the chapter.

5. Chapter V

The fifth chapter does for counterreconnaissance what the fourth chapter does for reconnaissance. The chapter presents a task analysis of the principal element of counterreconnaissance—the screen task. The chapter then supplies the reader with a comprehensive command and control structure for counterreconnaissance based on the uncertainty identified in the task analysis. The structure uses the coordinating mechanisms and design elements provided in Chapter IV.

6. Chapter VI

Chapter VI concludes the thesis and provides areas of potential future study concerning command and control structure for reconnaissance and counterreconnaissance within the armor and mechanized infantry task force.

II. RECONNAISSANCE AND COUNTERRECONNAISSANCE

A. INTRODUCTION

Success in battle depends on the commander's ability to understand the battlefield. The commander must know the area of operations, the conditions in which forces will fight, and the nature, capabilities, and activities of the enemy. Avoiding enemy strengths while exploiting their weaknesses allows the commander to employ surprise and catch the enemy at a disadvantage as often as possible.

To do this, the commander must have information. Intelligence operations provide the commander information about the enemy and the area of operations. Intelligence is the product resulting from collection, evaluation, analysis, integration, and interpretation of all available information concerning the enemy and the area of operations. This information is either immediately or potentially significant to military planning and operations.

Intelligence is the responsibility of all commanders. Intelligence provides a basis for estimating enemy capabilities, courses of action, and intentions. The commander uses this information when planning friendly operations. Intelligence is generally categorized as strategic or tactical. Strategic intelligence is:

> Intelligence that is required for the formulation of policy and military plans at national and international levels. Oriented on national objectives, it assists in determining feasible national policies and in furnishing a basis for planning. Factors which influence the military capabilities, vulnerabilities, and probable courses of action of

nations are considered components of strategic intelligence. [Ref. 7:p. 29]

Tactical intelligence differs from strategic intelligence in terms of scope and detail. The primary distinction between strategic and tactical intelligence is in level of application. Units at corps and below usually generate and use tactical intelligence. The Joint Chiefs of Staff Publication 1 (JCS Pub. 1) defines tactical intelligence as "intelligence that is required for the planning and conduct of tactical operations." [Ref. 3:p. 362] While strategic intelligence contributes to tactical intelligence, local reconnaissance provides the majority of information necessary to fight the close and deep operations at the tactical level.

Timely and accurate information provides the tactical commander the means necessary for understanding the environment and the enemy. It is with this information that commanders can effectively focus combat power. The U.S. Army uses tactical reconnaissance operations to produce accurate and relevant information around which a commander maneuvers combat units. JCS Pub. 1 defines reconnaissance as:

> A mission undertaken to obtain, by visual observation or other detection methods, information about the enemy; or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. [Ref. 3:p. 304]

Counterreconnaissance serves as the logical inverse of reconnaissance by denying information to the enemy. JCS Pub. 1 defines counterreconnaissance as a culmination of "all measures taken to prevent hostile observation of a force, area, or place." [Ref. 3:p. 94] The success of reconnaissance or counterreconnaissance is a function of the amount of information gathered about, or denied to, the enemy.

B. BACKGROUND

The importance of reconnaissance to the commander is apparent to the student of military warfare. The significance of obtaining or denying information attests to the success or failure of many battles and campaigns. Today, training exercises conducted at the Army's National Training Center at Fort Irwin, California confirm the difficult lessons of the past. Three historical examples provide an understanding of the importance of reconnaissance or counterreconnaissance to the commander.

1. Agincourt

The Battle of Agincourt is representative of the dire consequences that combat forces face when they lack information about enemy dispositions and the environment. The climax of Henry V's invasion of France in 1415, Agincourt was the last great English martial achievement of the Hundred Years' War. Henry had intended to march his army of 5,700 soldiers from the Normandy port of Harfleur to the English-held fortress at Calais. From here, the army would spend the winter preparing for the next campaign. Charles d'Albret, Constable of France, had approximately 25,000 soldiers under arms, 7,000 of which were mounted knights. Constable d'Albret was intent on cutting off and destroying Henry V's army before it could reach Calais and safety.

After much maneuver by both, the morning of the 25th of October found the two unequal armies facing one another across the narrow and gently rolling plain bounded by the forests of Agincourt and Tramcourt. The French could not have been in a more unfavorable position. Making no effort to reconnoiter the terrain, the French commanders

crowded their forces in fields where there was little room for them to properly deploy or maneuver. Heavy rains had rendered the clay soil almost impassable to horses bearing the weight of armored knights but presented no obstacle to the lightly equipped English foot soldier. [Ref. 8:p. 282]

While the French remained on the defensive for several hours, the English used the time to reconnoiter the surrounding fields and forests. Information from the reconnaissance compelled Henry to position two columns of archers—one to lie in ambush on the left flank of the French, the other to his rear. With these elements in place, Henry ordered his forces forward and occupied a position at which the two forests were no more than 800 meters apart (Figure 1) [Ref. 9:p. 41]. The French had three lines of battle—the first two on foot and the third mounted. Deployed across a 1,200-meter front, the dense lines of soldiers had little room to maneuver, much less fight. [Ref. 9:pp. 40–42]

The battle opened with French cavalry making disorganized charges against Henry's flanks. From here, the heavily armored knights came under a rain of arrows, forcing them to into a narrow front against the English battle line. Arrow wounds to the horses and the lack of room to maneuver created a confused mass into which the English knights attacked. Seizing the opportunity of the moment, the English archers joined the fight. Those French forces not killed or captured were forced to flee, trampling through the advancing ranks of their own center. The defeat was so decisive that the French knights, while still outnumbering Henry's forces, chose not to renew the attack. [Ref. 9:pp. 39–42]

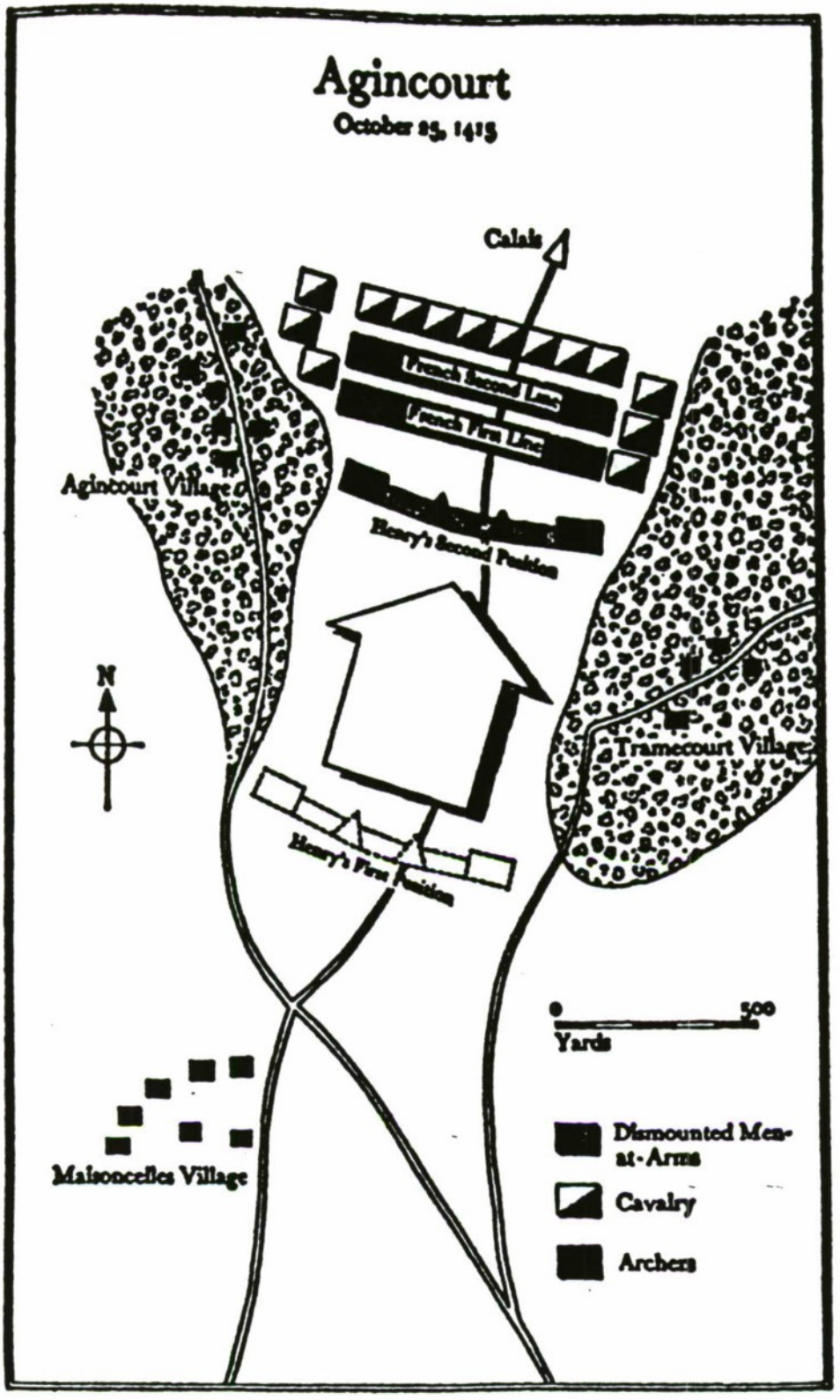

Figure 1. **The Battle of Agincourt**

Henry's use of the terrain to his advantage and the lack of reconnaissance by the French proved to be the decisive factors in this battle. By occupying a narrow front, Henry forced the French to assume an equally narrow front, a maneuver that proved advantageous to the heavily outnumbered English. The position of the English archers, unknown to the French, forced the French cavalry into such close quarters that they were unable to raise their weapons to strike a blow. The condition of the ground provided poor footing for the heavily armored knights and favored the maneuverability of the English foot soldier. Had the French conducted proper reconnaissance of the terrain and the enemy, the Battle of Agincourt might never have been fought under such disadvantageous conditions. [Ref. 9:p. 41–42]

2. The Battle of the Little Bighorn

Mid-afternoon of 24 June, 1876 found the 7th U.S. Cavalry, under the command of LTC George Armstrong Custer, at the headwaters of the Rosebud River, approximately 30 miles from the Little Bighorn. Custer had been detached from a larger force headed by General Alfred Terry. Custer's mission was to swing south of a large band of Indians and prevent their movement to the Bighorn Mountains, while a larger column under Terry moved north and then down the Bighorn River. This would entrap the Indians between the two columns, giving them no choice, short of annihilation, but to surrender. Because maps of the area were rare and inaccurate, Custer sent out three groups of Indian scouts. One group occupied a position on a redoubt that provided a commanding view of the terrain. From here, they were able to locate an immense Indian

village 15 miles distant. Rather than rest his men and conduct further reconnaissance, Custer instead chose to move his forces closer to the village, intending to attack it prior to its possible dispersal. [Ref. 10:pp. 15–16]

Without being sure of the exact size and location of the village, Custer divided his force into three parts. Three troops under the command of Major Marcus Reno were to move down a creek and attack the village from the south. Custer, with five cavalry troops under his immediate command, would move west and then north and attack the village from its opposite end. The three remaining troops under the command of Captain Frederick Benteen were to move southwest, with the intent to cut off any Indian movement in that direction. Continuing to ride north along the top of the bluffs that overlooked most, but not all, of the Indian camp, Custer could see that Major Reno had engaged the enemy. Riding back behind the bluffs until he came to a coulee which led to the Bighorn River, Custer proceeded down the coulee, thinking he would strike the village's north end. Custer's force instead hit the village in its middle, where it was outnumbered by a margin of almost six to one. [Ref. 10:p. 18]

Custer's forces proceeded to fight an orderly withdrawal in order to occupy some high ground to the rear. Without conducting a reconnaissance of the area from which he intended to fight until relief arrived from Reno, Benteen, or Terry, Custer stumbled upon an additional 1,000 Indians led by the war chief Crazy Horse. The resulting fight lasted no

more than 20 to 30 minutes and ended with the total annihilation of Custer's five troops. [Ref. 10:pp. 19-20]

Custer made numerous mistakes of an intelligence nature during the Battle of the Little Bighorn. Because he did not conduct a reconnaissance of the objective (the village), Custer had a poor appreciation of the terrain and the enemy dispositions. Custer's failure to conduct reconnaissance during the battle left him unaware of Crazy Horse's movement north to deny him the high ground he desired. Lastly, and most important, Custer's lack of information about the enemy size and disposition led him to incorrectly assume that the Indians would scatter when attacked by his regiment of some 675 soldiers. This led him to prematurely attack a force of approximately 4,500 warriors, the largest concentration ever to assemble in North America.

3. Counterreconnaissance in Vietnam

A technique used by air-mobile forces to defeat enemy reconnaissance efforts in Vietnam employed a reaction force consisting of three to five lift helicopters, two to four Cobra gunships, and an infantry platoon on strip alert. When the U.S. forces observed enemy reconnaissance elements, the reaction force, working as a team, would engage the enemy by way of an air assault with the Cobras providing fire support. When the ground element either killed or forced the enemy reconnaissance to withdraw, the reaction force would return to the airfield and prepare for the next insertion. This technique provided the commander with intelligence about enemy reconnaissance efforts, force security against these efforts, and allowed U.S. forces to retain the initiative. [Ref. 11:p. 3]

The preceding examples provide hard lessons of the importance of obtaining, or denying, information necessary to support the commander's scheme of maneuver. The Army uses its National Training Center (NTC) at Fort Irwin, California to confirm the need for timely and effective reconnaissance operations at the tactical level. In a memorandum published as part of the Army's policy of widely disseminating lessons learned at the NTC, a former commander of the NTC, BG E. S. Leland, writes:

> The importance of reconnaissance cannot be overemphasized. There is typically a battle which precedes the battle—a confrontation of opposing reconnaissance units—and the winner of that preliminary battle is most often the victor in the main event. [Ref. 12:p. 2]

A 1987 RAND study confirms this assessment of the importance of reconnaissance to mission success. The study encompasses the results of 113 force-on-force battles. Analysis of the results of reconnaissance shows that there is a high correlation between task force success in the attack and success in the reconnaissance that precedes it. Further analysis shows that poor reconnaissance almost always leads to mission failure [Ref. 4:p. 9]. In light of these conclusions, it is apparent that reconnaissance serves as a combat multiplier because reconnaissance constitutes a small expenditure of the task force resources.

C. RECONNAISSANCE

Most information needed in combat comes from assets within the combat force. The commander uses the assets of the task force to perform reconnaissance operations in the area of immediate interest. Reconnaissance is the vital part of the task force intelligence collection effort.

Reconnaissance is undertaken to collect information by visual or other detection means.

Fresh information about the enemy and terrain establishes the conditions for success in the offense at the task force level. Reconnaissance should always precede the commitment of the task force to any course of action. During offensive operations, the maneuver of the task force should be based on the concept of "reconnaissance-pull." [Ref. 6:p. 3] At the task force level, reconnaissance determines the suitability of intended maneuver routes, the strengths and weaknesses of enemy positions, and the existence of gaps, and should "pull" the task force main body along the path of least resistance. At the NTC, many commanders attempt to "push" the strength of the task force along a pre-determined axis of advance [Ref. 6:p. 3]. This method typically results in the task force matching its strength against the strength of the defender, resulting in significant losses for the attacker. With reconnaissance-pull, the task force reconnaissance effort determines the axis of advance based on the results of gathered information [Ref. 6:p. 3].

Surveillance is a corollary of reconnaissance that the task force commander must include in his reconnaissance plan. Department of the Army Field Manual 34-80 (*Brigade and Battalion Intelligence and Electronic Warfare Operations*) defines surveillance as:

> The systematic observation of aerospace, surface or subsurface areas, places, persons, or things by visual, aural, electronic, photographic, or other means. Surveillance is characterized by wide coverage of a target area and by repetition. It is normally used to gain information in those aforementioned areas over a long period of time to note any changes that may take place. [Ref. 13:p. 4-42]

The interrelationship of reconnaissance and surveillance permits the task force commander to commit the same assets to the execution of reconnaissance and surveillance missions and tasks. The reconnaissance effort of these assets must revolve around the commander's concept of operation. The task force commander determines prioritized information needs, provides operational direction to his staff to assist in reconnaissance planning, and then oversees the execution of the reconnaissance plan.

1. Reconnaissance Principles

Several principles and fundamentals of reconnaissance exist to assist the commander and his staff in planning reconnaissance operations. Principles of reconnaissance can assist the commander's thought process as he determines how and where to focus information collection. Reconnaissance principles are generally situationally independent and aid the thought processes of the commander and staff during times of emotional or physical stress. In his article "Principles of Reconnaissance," Lieutenant Colonel Wayne M. Hall provides eight principles that assist in planning reconnaissance operations.

- Information must be timely. At the tactical level timely information is critical to decision making. The quick tempo of operations at the task force level requires information timely enough to kill the enemy before it can gain the advantage. Aspects of information collection that cause information delays include: multi-layered bureaucracy, analysis time, environmental constraints, human error;

- Reconnaissance operations must be aggressive. Aggressive pursuit of information allows the task force commander to retain the initiative. Aggressive operations are essential against a well equipped and determined enemy;

- Reconnaissance operations must be continuous, seeking information 24 hours a day, seven days a week. Planning and executing continuous reconnaissance is essential in retaining initiative. Technological improvements, especially in the area of maneuver, ordain continuous reconnaissance operations;

- Reconnaissance operations must focus combat power. Reconnaissance operations must "pull" the task force toward enemy weaknesses. Reconnaissance operations must gather information critical to the commander's intent by focusing on the enemy's center of gravity;

- Commanders need relevant information to make good decisions. Relevant information is both accurate and reliable and should conform to the reality of the situation;

- The most effective reconnaissance operations are secret. Reconnaissance forces must be able to operate under the protection and advantage of secrecy, or stealth. Secrecy in reconnaissance operations enables the commander to anticipate and manipulate the enemy commander. Conducting reconnaissance operations without regard for secrecy results in a forfeiture of any advantage that surprise offers;

- Reconnaissance operations must provide accurate information. Reconnaissance assets must provide information that is free of distortion. Collection assets must be the task force's "eyes and ears" and not its brain. Information collectors must be aware of technological, natural, and human factors that distort information; and

- Reconnaissance operations must be complementary. Balancing the capabilities of reconnaissance assets is key to successful information gathering. The systems available to conduct reconnaissance must complement their respective strengths and weaknesses. Redundant information collection assets help reduce the potential for deception or system breakdowns. Asset limitations require task force commanders to balance the need for "completely" accurate information against timely information. [Ref. 14:pp. 10–13]

2. Fundamentals of Reconnaissance

Department of the Army Field Manual 17-98 (*Scout Platoon*) provides the armor and mechanized infantry scout platoon with six

fundamentals of reconnaissance, some of which are similar to the principles that LTC Hall presents. The six fundamentals of reconnaissance assist leaders at all levels during the planning and execution of reconnaissance missions.

- Use maximum reconnaissance forward. Keep the scouts forward where they can effectively accomplish their reconnaissance missions;
- Orient on the reconnaissance objective. The scheme of maneuver for reconnaissance assets should focus on a specific objective;
- Report all information rapidly and accurately [This fundamental is similar to LTC Hall's first and seventh principles];
- Retain freedom to maneuver. Task force scouts must be able to maneuver in the area of operations to accomplish the mission. This is especially true once the scouts make contact with the enemy. Rapid tactical developments at the task force level require scouts to retain the initiative to maneuver on the battlefield;
- Gain and maintain enemy contact. Once the scouts find the enemy, they must maintain contact using all available means unless the commander orders them to do otherwise; and
- Develop the situation rapidly. The dangers associated with locating the enemy require the task force scouts to assess situations as rapidly as possible. The scout platoon must integrate stealth and training in order to accomplish reconnaissance missions with minimal loss of assets. [Ref. 15:pp. 3-2 to 3-3]

The fundamentals of reconnaissance provide a commander and staff with guidelines that assist in planning, allocating resources for, and executing reconnaissance missions. Like reconnaissance principles, they are situationally independent and are applicable to variations in enemy, terrain, assets available, and reconnaissance mission.

3. Reconnaissance Techniques

Information-gathering elements employ reconnaissance techniques that achieve a balance between the level of risk and the security necessary to ensure mission accomplishment. Training and rehearsals are necessary to reduce the vulnerability of reconnaissance assets on the battlefield. Reconnaissance techniques provide a balance between the need for stealth and aggressiveness when performing reconnaissance. Reconnaissance forces employ the appropriate technique based on experience, professional judgement, time available, and the mission to be performed. There are three basic techniques that reconnaissance elements employ to gather information against the enemy or about the area of operations.

- Mounted reconnaissance. Reconnaissance forces conduct mounted reconnaissance when time is limited and detailed reconnaissance is not required. Mounted reconnaissance allows reconnaissance forces to maintain the fast tempo of combat operations. Mounted reconnaissance is predicated on known enemy locations and the absence of extensive obstacle systems;

- Dismounted reconnaissance. Reconnaissance forces conduct dismounted reconnaissance to obtain detailed information about terrain features, obstacles, or enemy forces. Since time is generally not limited, reconnaissance forces can employ stealth due to the expectation of enemy contact. Forces conduct dismounted reconnaissance when terrain restricts the movement of tracked or wheeled vehicles; and

- Reconnaissance by fire. Reconnaissance assets use direct or indirect fires on suspected enemy positions to cause the enemy to disclose its presence by movement or by returning fire. Forces use this method when enemy contact is expected and time is limited, or when they cannot use maneuver to develop the situation. This method eliminates the advantage of stealth and is generally not effective against disciplined troops. [Ref. 15:pp. 3-18 to 3-20]

D. COUNTERRECONNAISSANCE

Counterreconnaissance is the aggregate of task force actions taken to counter the enemy reconnaissance effort in the area of operations. Counterreconnaissance is both passive and active in that enemy reconnaissance forces must be detected and denied information or destroyed before they can report their observations [Ref. 6:p. 10]. Much like reconnaissance, counterreconnaissance must be continuous over time and throughout the depth of the battlefield.

Because enemy reconnaissance operations will begin well ahead of any planned tactical operation, the task force must plan counterreconnaissance so as to use all assets available to detect the enemy early. A successful counterreconnaissance plan requires early coordination, thorough rehearsal, and comprehensive staff control. The task force must complete several planning steps in order to ensure that sufficient assets and appropriate techniques are employed against the enemy reconnaissance effort.

1. Counterreconnaissance Planning

Counterreconnaissance planning requires the participation of the commander and the entire task force staff. The commander and the staff work to ensure that the counterreconnaissance actions of the task force are synchronized, mutually supporting, and sufficient to counter the enemy reconnaissance effort. The task force commander and staff should perform the following tasks to ensure that the enemy reconnaissance elements are detected early. [Ref. 16:p. 4-47]

a. Specify the Security Force Mission

The method and means to provide early warning, detection, neutralization, and destruction of enemy reconnaissance elements should be specified by the commander and his staff. The commander must provide his operational intent to the security force commander(s) prior to the deployment of those forces. It is essential that every soldier in the task force know the commander's intent for counterreconnaissance.

b. Provide Sufficient Assets

While counterreconnaissance is essentially a responsibility of the entire task force, the unit should have a screening force to detect the enemy's approach and defeat the enemy's reconnaissance efforts. According to Department of the Army Field Manual 101-5-1 (*Operational Terms and Symbols*), a screening force:

> Maintains surveillance, provides early warning to the main body, impedes and harasses the enemy with supporting indirect fires, and destroys enemy reconnaissance within its capability. [Ref. 17:p. 43]

The screening force requires a minimum of two elements—a force dedicated to acquire enemy reconnaissance elements and a force to close with and destroy enemy reconnaissance [Ref. 6:p. 11].

A forward security force provides greater resistance against enemy reconnaissance by preventing enemy observation of the task force activities and dispositions. The forward security force also provides deception by creating a false picture of the task force dispositions. [Ref. 6:p. 11]

c. Establish Security Early and Well Forward

The screening force should be in place before the task force's company teams move into their battle positions and before work on obstacles begins [Ref. 16:p. 4-47]. The force must be far enough forward (about three to five kilometers forward of task force defensive positions and obstacles) to prevent enemy observation of defensive preparations [Ref. 6:p. 11].

d. Put Security in the Right Place; Ensure Complete Coverage

The task force S-2 recommends to the operations officer (S-3) the general location of the counterreconnaissance force based on his terrain and threat analysis. The task force commander approves the plan and provides the commanders of elements within the screening force with his intent of how to defeat the enemy reconnaissance effort. Each element commander adjusts the plan to the terrain to ensure complete coverage. [Ref. 16:p. 4-48]

The task force commander should include in his intent the exact responsibility of each company team in the overall counterreconnaissance plan. The actions taken by the company teams in the event of enemy penetration of the security element provide the depth required of a good counterreconnaissance plan.

2. Counterreconnaissance Techniques

Relying on the task force's company teams to provide their own local security and on the scout platoon to acquire and destroy the enemy's mounted reconnaissance often results in gaps in the coverage

through which the enemy will penetrate. Efficient use of available assets in a well-coordinated plan ensures that the enemy reconnaissance will encounter severe difficulties as they attempt to penetrate the defense. While there is no set doctrine to ensure success, there are several techniques available to counter the enemy reconnaissance effort. [Ref. 18:pp. 1-2]

a. Attach a Thermal Sight Equipped Tank Platoon to the Scouts and Place It Forward

The scouts acquire enemy reconnaissance forces and alert the tank platoon. The tank platoon responds to the sighting by intercepting and destroying the enemy scouts. This option requires in-depth coordination between the tank platoon leader, S-2, S-3, and scout platoon leader. It also requires a communications net on which the tank platoon leader, scout platoon leader, and S-2 can operate in order to facilitate rapid instructions and information passing.

b. Use the Scout Platoon to Acquire and Destroy Enemy Reconnaissance Elements

Under the present table of organization and equipment (TOE), the scout platoon in the armor and mechanized infantry task force has the firepower to destroy enemy reconnaissance elements (six M3 Cavalry Fighting Vehicles, each equipped with a 25 millimeter cannon and the TOW Antitank Missile System). The limited number of vehicles to conduct a screen causes the platoon to be spread too thin and creates gaps that are susceptible to enemy penetration. Distinct signature of the weapon systems compromise the scout's observation post locations. Scouts that fight lose their ability to observe their area of responsibility,

enabling the enemy to penetrate with other elements. Using this technique, the task force commander runs the risk of losing his most valuable reconnaissance asset. This technique does allow the task force commander to retain maximum combat forces in the main defensive area.

c. Designate a Company Team to Provide a Reaction Force

This technique requires close and continuous coordination between the company team and the scout platoon leader. Allowing the enemy to penetrate the forward screen creates the possibility of losing the enemy reconnaissance element between the time it is sighted and the time the reaction force can move to intercept. Multiple simultaneous penetrations by the enemy could create additional problems for the reaction force, most specifically fratricide.

d. Designate "No Movement Areas" for Company Team Battle Positions

Company teams are responsible for covering "no movement areas" by direct fire. The company team engages any element within the boundaries of the "no movement area." This technique requires extensive coordination and increases the possibility of fratricide. Area boundaries must be clearly visible and well marked. This technique enables the task force to retain maximum combat power in the main battle area.

e. Use a Company Team in a Forward Screen Role

This technique provides a strong counterreconnaissance capability, gives a measure of deception, and facilitates early engagement. A company team has the assets to deal with dismounted enemy reconnaissance elements, as well [Ref. 6:p. 12]. The company team

withdraws at the direction of the task force commander to its primary battle position to fight the main battle.

The techniques of counterreconnaissance offer the task force commander and staff several options for the organization of assets and conceptual development necessary to defeat the enemy reconnaissance effort. Counterreconnaissance techniques are flexible to the needs and constraints of the task force and the area of operations. Staff analysis and planning must take these factors into consideration when planning for reconnaissance and counterreconnaissance. The Intelligence Preparation of the Battlefield provides the tool to conduct required analysis and planning.

E. INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB)

Intelligence preparation of the battlefield is an integral part of the task force command and control process. IPB is the factor that allows the task force to react quicker than the enemy. FM 34-80 defines IPB as "the continuous and systematic process of evaluating the enemy, weather, and terrain for a specific battlefield area." [Ref. 13:p. 4-11] IPB allows the staff to plan for missions based on analysis of the enemy and friendly situations and the area of operations.

The task force S-2 is responsible for collecting, analyzing, and reporting the information essential to the IPB process. IPB provides the basis for all intelligence operations, tactical decisions, and tactical operations. The task force staff uses IPB information to develop the operation plan, the collection plan, and the reconnaissance and surveillance plan. IPB integrates threat doctrine with the terrain and weather to determine

and evaluate enemy capabilities, vulnerabilities, and probable courses of action. The staff uses IPB to confirm their initial estimates of the area of operations and the enemy.

Department of the Army Field Manual 71-2 (*The Tank and Mechanized Infantry Battalion Task Force*) lists five functions of the IPB process. The functions of the IPB provide the task force S-2 a systematic approach for information analysis.

1. Function 1—Battlefield Area Evaluation

The commander and S-2 together view the present and future area of operations and interest in four dimensions: width, depth, height, and time. The S-2 can then assemble the information and materials needed to continue the IPB process. The S-2 requests information on normal climatic, weather, and area studies from the brigade S-2. The S-2 assembles the maps required to give complete coverage of the task force area of operations and interest. [Ref. 16:p. 2-23]

2. Function 2—Terrain Analysis

The S-2 identifies the effects of terrain on combat operations. The S-2 relies on the brigade S-2 to provide terrain factor overlays to perform IPB. In the absence of such overlays, the S-2 conducts the analysis with assistance from the task force engineer. Terrain is analyzed using the five military aspects of terrain: observation and fields of fire, cover and concealment, obstacles, key terrain, and avenues of approach. Because of the effect that weather can have on terrain, the S-2 conducts terrain analysis concurrently with weather analysis. [Ref. 16:p. 2-23]

3. Function 3—Weather Analysis

Weather conditions can significantly affect the mobility requirements for ground operations. The five military aspects of the weather that concern intelligence support to operation planning are: temperature and humidity, precipitation, winds, clouds, and visibility. The S-2 integrates the terrain data with the weather data to provide an assessment of the area and its effect on operations. [Ref. 16:p. 2-24]

4. Function 4—Threat Evaluation

The S-2's IPB threat evaluation consists of available enemy order of battle factors. These include:

- Unit identification;
- Composition;
- Disposition;
- Strength;
- Training;
- Tactics;
- Logistics; and
- Combat Effectiveness. [Ref. 16:p. 2-25]

When this information is not available, the S-2 uses a generic doctrinal template as the threat evaluation tool. The doctrinal template displays enemy composition, formation, frontages, and depths. The template depicts enemy doctrinal deployment for various types of operations. [Ref. 16:p. 2-25]

5. Function 5—Threat Integration

The S-2 relates the threat evaluation to the terrain and weather to predict how the enemy will maneuver in the area of operations. Situation, event, and decision support templates assist in the development of threat integration. The S-2 uses the templates to identify enemy courses of action, reaction to events, and possible threat activities. Estimating the enemy's actions and intentions provide the S-2 with the answers to the questions where to look, what to look for, and when to look. [Ref. 16:p. 2-27]

IPB provides a tool for systematic analysis of the enemy, weather, and terrain to determine enemy capabilities, vulnerabilities, and probable courses of action. IPB enables the S-2 to determine how and where to position reconnaissance and surveillance assets in order to confirm the estimates made during the process.

F. RECONNAISSANCE RESOURCES IN THE TASK FORCE

The resources available to conduct reconnaissance typically determine the reconnaissance mission type. Human intelligence (HUMINT), imagery intelligence (IMINT), and signals intelligence (SIGINT) support current or planned operations for collecting specific, detailed information at a particular time and location. Resource systems generally classify reconnaissance into three categories: ground tactical reconnaissance, reconnaissance of the electromagnetic spectrum, and aerial reconnaissance.

The limited assets organic to or supporting a task force restrict the task force primarily to the conduct of ground tactical reconnaissance.

The types of systems available to the task force commander assist in further defining the type of reconnaissance and the techniques necessary to accomplish it.

1. Intelligence Resources at the Task Force Level

The principal information-gathering resources available to the task force include its organic scout platoon and subordinate maneuver companies. The task force uses patrols, observation posts, and individual soldiers to collect and report information about the enemy, terrain, and weather. [Ref. 13:pp. 2-2 to 2-3]

a. Individual Soldiers

Individual soldiers provide the task force commander and staff with the majority of timely combat information. Individual soldiers observe and report real-time information concerning enemy equipment, patrols, reconnaissance, activities, and dispositions.

b. Observation Posts

The task force establishes observation posts (OPs) to observe and listen to enemy activity within particular sectors. Communication between the task force and each observation post is essential. Ground surveillance radars, remote sensors, and observation devices (day and night) may augment observation posts.

c. Patrols

The task force conducts patrols prior to and during operations for reconnaissance, counterreconnaissance, and security. There are two types of patrols: reconnaissance and combat. Reconnaissance patrols

collect information and confirm or disprove the accuracy of previous information. The three types of reconnaissance patrols are:

- Route reconnaissance. Route reconnaissance patrols obtain information about the enemy and any dominating terrain along a specific route [Ref. 15:p. 3-32];
- Zone reconnaissance. Zone reconnaissance collects information about the enemy and terrain between specific boundaries. This is typically the most time- and resource-consuming of the three types of reconnaissance patrols [Ref. 15:p. 3-39]; and
- Area reconnaissance. Area reconnaissance collects information about the enemy and terrain within a defined geographical area that is critical to the operation [Ref. 15:p. 3-44].

The task force uses combat patrols during reconnaissance and counterreconnaissance as well as to provide security to the task force main body. The primary mission of a combat patrol is to harass, destroy, or capture the enemy with collection of combat information relegated to a secondary mission [Ref. 13:p. 2-3]. Captured enemy soldiers and documents provide information about the enemy that cannot be obtained by observation alone.

d. Maneuver Companies

The maneuver companies of the task force contain resources that facilitate the collection of information. Weapons systems provide enhanced optics for observation, while combat vehicles afford a means for mounted patrols. The unit's individual soldiers occupy observation posts and conduct patrols to gather information about the enemy and terrain in the immediate area.

e. Scout Platoon

As the primary information-gathering asset, the scout platoon provides reconnaissance and security for the task force. Through reconnaissance, the scout platoon assists in the movement of the task force and its subordinate elements. During movement, the scout platoon often "screens" a flank, the front, or the rear of the task force, providing early warning in the event of enemy contact. The scout platoon serves as "the commander's eyes and ears on the battlefield" by providing current battlefield information to the commander to assist in the planning and execution of the mission. [Ref. 15:p. 1-1]

2. Supporting Resources

Field artillery, military intelligence, Army aviation, tactical air forces, air defense artillery, combat engineers, and various combat service support units provide the task force commander with supplementary means and resources to satisfy his information requirements [Ref. 13:p. 2-4]. The extent of information that each provides is based on the availability of each asset to the task force.

a. Field Artillery

The task force receives a Fire Support Section (FSS) from the brigade direct support field artillery battalion. The mission of the FSS is to assist in the planning, directing, and coordinating of all fire support operations [Ref. 13:p. 2-4]. The FSS provides each maneuver company of the task force with a Fire Support Team (FIST) that supports the company in much the same manner as the FSS does at task force level. In the armor and mechanized infantry task force, the FIST acts as the basis

for the artillery's target acquisition effort. The company Fire Support Officer (FSO) acts as the liaison between the maneuver company and the direct support field artillery firing batteries. Forward observers from the FIST often accompany reconnaissance patrols and assist in manning observation posts. [Ref. 13:p. 2-5]

The FIST is suitably equipped to assist in gathering and communicating information about the enemy and terrain. Each FIST is equipped with a Digital Message Device (DMD) that is capable of sending and receiving digitally transmitted messages using existing FM radios. The FIST vehicle (FISTV) integrator, the ground laser designator-range finder, the AN/GVS-5 hand-held laser range finder, the DMD, and the night observation devices on the FISTV enhance the capability of the FIST to provide real-time combat information to the task force.

b. Military Intelligence

The division military intelligence battalion typically provides the task force with a Ground Surveillance Radar (GSR) squad. The GSRs provide the task force with a mobile, near-all-weather, 24-hour capability for battlefield surveillance. The task force may employ GSRs on patrols and at observation posts. Operating ranges for the radars are shown in Table 1 [Ref. 13:p. 2-8].

Both radars can detect targets and provide more accurate distance and directional data than is possible by visual estimate, especially under conditions of darkness or poor visibility [Ref. 13:p. 2-9]. GSR can also guide mounted or dismounted patrols during periods of reduced visibility [Ref. 19:p. 7].

TABLE 1

GSR OPERATING RANGES

Radar	**Operating Range** (meters)	
	Personnel	**Vehicles**
AN/PPS-5	6,000	10,000
AN/PPS-15	NA	3,000

Remote sensors (REMS) within the MI battalion provide a near-all-weather, day-and-night surveillance system. The system can function independently of, or supplement, other reconnaissance and surveillance systems. Scouts, maneuver companies, reconnaissance patrols, or sensor teams are capable of emplacing REMS. REMS provide the following advantages to the task force reconnaissance operation: timeliness, all-weather capability, continuous operation without regard to visibility or fatigue, and suitability for employment in high-risk environments. [Ref. 13:p. 2-10]

c. Army Aviation

Division and corps army aviation assets provide the task force commander with responsive and mobile means to find and fix enemy forces. While the majority of these elements remain under the operational control of their parent organization, the task force commander and staff must integrate their capabilities into the reconnaissance plan should the asset become available. Aviation assets are capable of conducting reconnaissance, surveillance, and security and screening missions. Aviation assets provide the commander the ability to insert

reconnaissance patrols deep into enemy territory. The commander can use aviation to emplace REMS aerially into areas that are inaccessible to ground units, to speed emplacement, or to increase the number of sensors that can be emplaced prior to a mission. [Ref. 13:pp. 2-10 and 2-12]

d. Tactical Air Force

The Joint Air Attack Team (JAAT) is a combination of Army rotary aircraft and Air Force close air support (CAS) aircraft that operates with ground maneuver forces at the brigade and task force level. Planning JAAT missions is essential if the full potential of the air-ground combat team is to be realized. Air reconnaissance reports, in-flight combat information reports, and air situation reports provide the task force commander with near-real-time information. The Air Force liaison officer (ALO) from the attached tactical air control party (TACP) acts as the staff representative for coordinating and planning JAAT missions at the task force level. [Ref. 13:p. 2-12]

e. Air Defense Artillery (ADA)

Short-range air defense (SHORAD) assets support the task force during combat operations. SHORAD elements often consist of a Vulcan or Chaparral squad, or a Stinger team or section. Forward area alerting radar and target alert data display set (FAAR/TADDS) systems provide the task force with air alert warning information. Early dissemination of possible air-ground attack or air assault operations from the area-wide ADA command and control system provides the commander with important combat information regarding the enemy air situation. [Ref. 13:p. 2-13]

f. Combat Engineers

The task force receives a combat engineer platoon from the brigade direct support engineer company. While the mission of the combat engineer platoon is not directly related to intelligence gathering, the combat information provided by individual soldiers, engineer reconnaissance, or terrain data expressly supports the mission of the armor and mechanized infantry task force [Ref. 13:p. 2-15]. Combat engineer support provides information on trafficability of intended routes, accessibility to key terrain, and disposition of enemy obstacles and fortifications. Combat engineers often accompany the task force scout platoon during reconnaissance missions. This allows the scouts to continue their reconnaissance while engineers conduct obstacle reconnaissance and breaching operations.

g. Combat Service Support

Combat service support (CSS) assets do not have an information gathering role beyond that of the individual soldier. The staff, particularly the task force intelligence officer (S-2), must consider and plan for the evacuation of captured enemy soldiers, documents, and equipment. CSS elements provide transportation and security assets for the rapid evacuation of captured material and personnel. [Ref. 13:p. 2-15]

The maneuver task force's organic and supporting assets are capable of supplying the task force commander with a vast amount of information about close-in enemy forces. Even though supporting assets are limited in availability and number, the task force commander and

staff must develop and maintain contingency plans in the event that they become available. The commander must therefore rely primarily on the organic elements of the task force for information gathering. The tactical mission and capabilities of organic assets often determine the reconnaissance technique that they employ.

G. THE ARMOR AND MECHANIZED INFANTRY TASK FORCE SCOUT PLATOON

1. Introduction

The scout platoon is organized, equipped, and trained to conduct reconnaissance and security for the task force. The platoon operates as part of the task force and should be assigned missions that capitalize on its reconnaissance capabilities. Scout effectiveness is a product of the scout's ability to provide meaningful intelligence to the task force.

The scout platoon remains an effective information-gathering asset so long as it employs stealth. Successful scout platoons obtain the majority of detailed combat information through stealthy dismounted patrolling and stationary observation [Ref. 6:p. 9]. A 1987 RAND study on tactical reconnaissance shows that scouts avoid losses through stealth and avoiding the enemy during reconnaissance. Even though the scout's reconnaissance vehicle, the M3 Cavalry Fighting Vehicle (CFV), contains two formidable weapon systems, the study shows a high mortality rate against opposing forces (OPFOR) security forces [Ref. 4:p. 61]. Scouts mounted on the M3 CFV have a tendency to initiate direct fire engagements and thus compromise their location to the enemy. The data contained in the RAND study shows the importance of avoiding the enemy

during reconnaissance [Ref. 4:p. 61]. When engaged by an enemy, scouts should immediately return a high volume of suppressive fire in the enemy's general direction, and then move as fast as possible to covered terrain. Scouts should use firepower only to restore their ability to conduct reconnaissance.

2. Organization

The scout platoon of the armor and mechanized infantry task force consists of an officer (first lieutenant) and 29 enlisted soldiers. The platoon is organized into a platoon headquarters and two scout sections. The platoon headquarters provides command and control for the scout platoon and consists of the platoon leader, the platoon sergeant, and their respective vehicle crews. The scout section consists of a section leader, a squad leader, and their crews manning two CFVs. Figure 2 depicts the organization of the scout platoon. [Ref. 15:p. 1-1 to 1-2]

Because the scout platoon is a small unit with a very large mission, the organization does not seem to provide the assets needed to conduct effective reconnaissance. In 1986, a United States Army Training Board White Paper concluded that:

> The scout platoon organization itself is flawed. Task force reconnaissance capability is severely affected by the current scout platoon organization and equipment. Commanders across the board agree that a six vehicle platoon is inadequate to cover the task force front. [Ref. 20:p. 2]

The study also addresses the problems that the CFV presents during the execution of the reconnaissance mission [Ref. 20:p. 2]. An assessment team of subject-matter experts confirmed this observation in

PLATOON HEADQUARTERS SECTION

VEHICLE 1

Platoon Leader

1 LT (Platoon Leader) R
1 SGT 19D20 (Gunner) R
1 SP4 19D10 (Scout Driver) P
1 SP4 19D10 (Scout) R
1 PFC 19D10 (Scout) R, GL

VEHICLE 4

Platoon Sergeant

1 SFC 19D40 (Platoon Sergeant) R
1 SGT 19D20 (Gunner) R
1 SP4 19D10 (Scout Driver) P
1 SP4 19D10 (Scout) R
1 PFC 19D10 (Scout) R, GL

SCOUT SECTIONS

VEHICLES 2 AND 5

Section Leaders

1 SSG 19D30 (Section Leader) R
1 SGT 19D20 (Gunner) R
1 SP4 19D10 (Scout Driver) P
1 SP4 19D10 (Scout) R
1 PFC 19D10 (Scout) R, GL

VEHICLES 3 AND 6

Squad Leaders

1 SSG 19D30 (Squad Leader) R
1 SGT 19D20 (Gunner) R
1 SP4 19D10 (Scout Driver) P
1 SP4 19D10 (Scout) R
1 PFC 19D10 (Scout) R, GL

LEGEND: R = Rifle
P = Pistol
GL = Grenade Launcher

Figure 2. **Scout Platoon Organization**

a 1987 study of reconnaissance and counterreconnaissance operations in the heavy brigade and task force. The study concluded that:

> The M3 is unsatisfactory for use as a reconnaissance vehicle. The large profile, height, and noise it generates makes it impossible for scouts to move stealthily across the battlefield. [Ref. 6:p. 16]

The crew required to operate the M3 CFV contributes to the inability of the scout platoon to adequately conduct its missions. The study further states that:

> With the introduction of the M3 came a reduction in the number of scouts available in each squad to perform dismounted reconnaissance and surveillance operations. Although authorized five, scout squads in the active force usually muster three or four men in each squad. The M3 requires three men to operate the vehicle effectively, usually leaving only one scout to dismount. Given this limitation, the tendency is for scouts to remained mounted. [Ref. 6:p. 16]

In 1988 three units experimented with the size and equipment of the scout platoon while conducting training exercises at the National Training Center. All three units used some mix of the High Mobility Multiple Wheeled Vehicle (HMMWV) in lieu of the M3 CFV, with one task force increasing the size of the scout platoon to eight vehicles. In all three cases, the scouts mounted in HMMWVs were able to successfully penetrate the enemy security element and provide essential intelligence to the task force [Refs. 21 and 22]. Improvements in stealth, fuel consumption, and time required to conduct logistical resupply were noted.

The effectiveness of the HMMWV as a reconnaissance vehicle has led the Army to explore the possibility of reconfiguring the task force scout platoon.

3. The Ten-Vehicle Scout Platoon

Over the past ten months, the Armor School and the 24th Infantry Division have participated in a concept and evaluation plan (CEP) to reconfigure the armor and mechanized infantry scout platoon. The Armor School has developed two candidate organizations: (1) a platoon of four M3 CFVs, six HMMWVs, and four military motorcycles; and (2) a HMMWV platoon of ten HMMWVs and four motorcycles (Figures 3 and 4) [Ref. 23:pp. 8 and 10]. All HMMWVs mount either an AN/TAS-4 or AN/TAS-6 long-range thermal sight, and either the MK19 grenade launcher or an M60 machine gun. Four STINGER missiles are organic to the platoon for defense primarily against helicopter gunships. Individual optical devices have been doubled to increase surveillance capability. Provisions for the use of the GVS-5 laser rangefinder have been made but not yet tested. [Ref. 5:p. 5]

In August 1989, two task forces from the 24th Infantry Division participated in focused rotational training exercises at the NTC. Each task force was configured to one of the two candidate organizations. Both task force scout platoons were scrutinized by subject-matter experts.

The performance of both scout platoons demonstrated that the ten-vehicle/four-motorcycle platoon increases the reconnaissance and security capability of the task force [Ref. 5:p. 13]. The ten-vehicle scout platoon can operate more observation posts, cover a wider front, perform a larger number of simple reconnaissance missions, and provide more depth to a counterreconnaissance screen. The lightweight wheeled

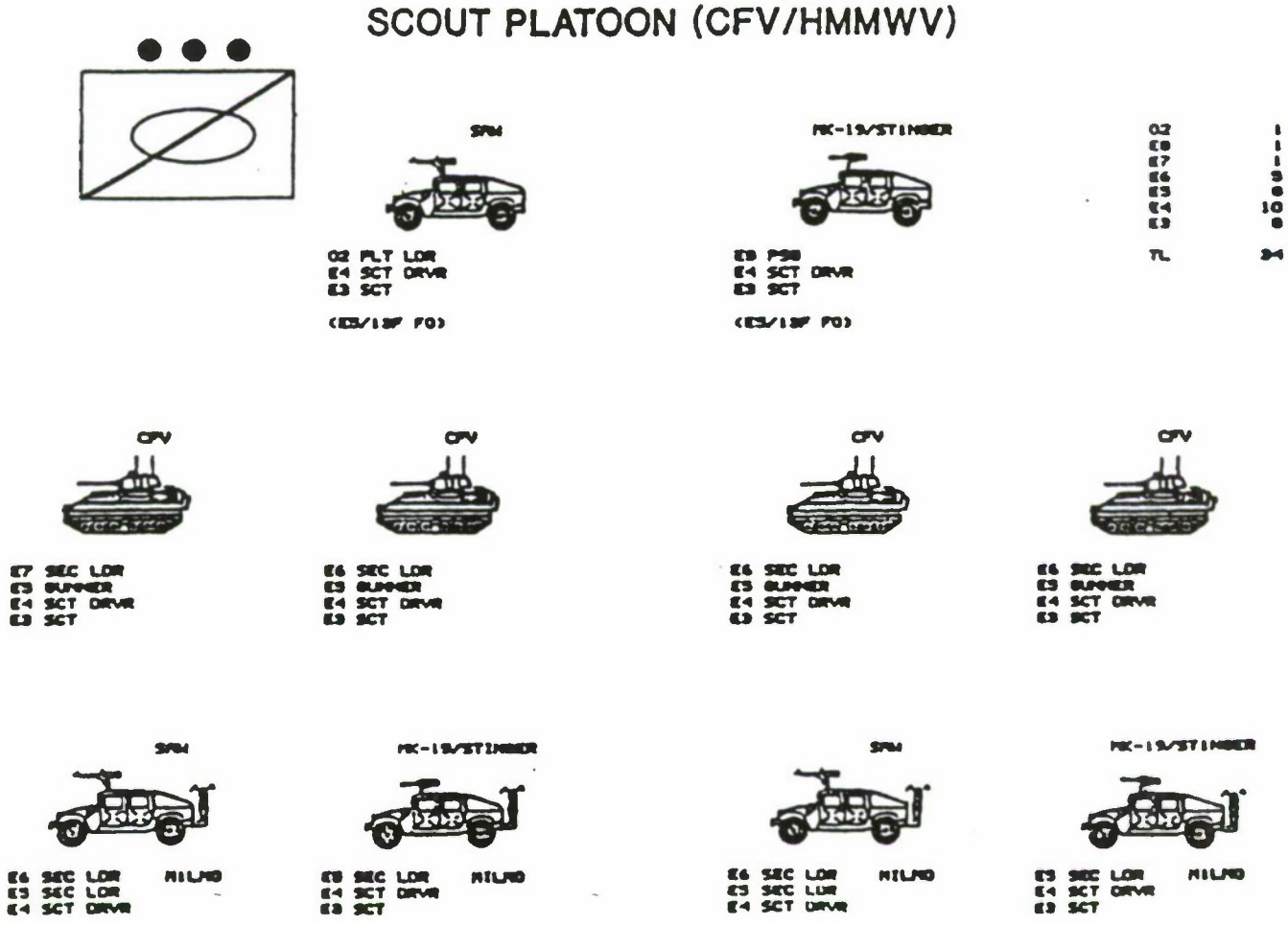

Figure 3. **Ten-Vehicle Scout Platoon, CFV/HMMWV Mix**

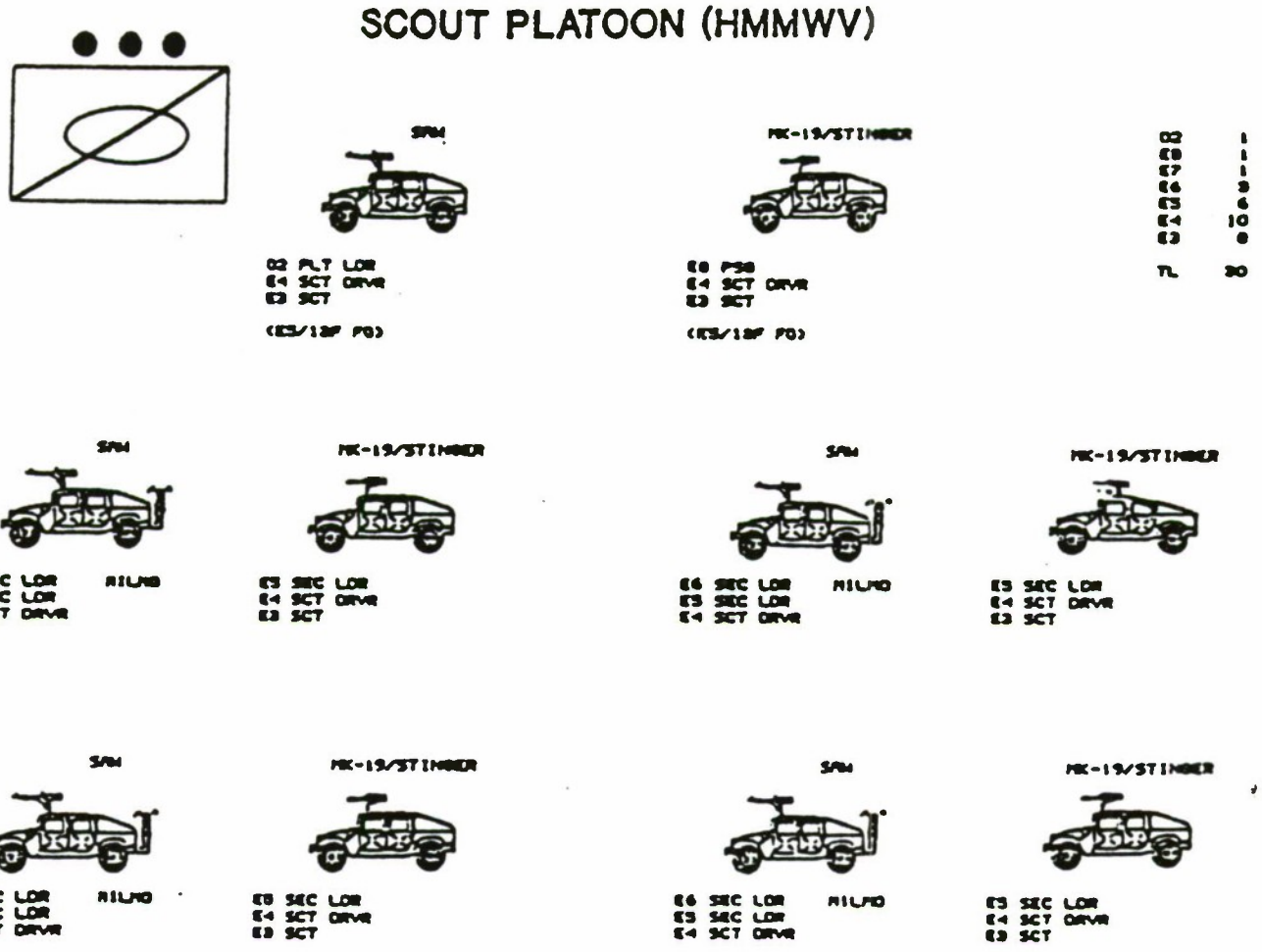

Figure 4. **Ten-Vehicle Scout Platoon, All HMMWV**

vehicles make the ten-vehicle scout platoon more stealthy than the current platoon [Ref. 5:p. 16]. Motorcycles add mobility, speed, and maneuverability to the scout platoon. Motorcycle scouts provide the task force commander with an asset that can conduct long-range reconnaissance in a relatively short amount of time [Ref. 24:p. 33].

H. SUMMARY

The need for information about the enemy has been evident since the dawn of warfare. Information assists the commander in projecting his forces in a coherent and calculated manner. While a commander's staff has the capability to conduct estimates based on doctrinal and situational templating, the commander must have accurate and timely information on which to base his tactical decisions. The ten-vehicle scout platoon provides the armor and mechanized infantry task force commander a significantly improved means for collecting information about the enemy.

Denying the enemy information through counterreconnaissance is just as important as gaining it. By prohibiting the entry of enemy reconnaissance into the task force area of operations, the task force commander disrupts the enemy commander's decision cycle. The commander has several options through which to defeat the enemy reconnaissance effort.

While a commander may have the physical assets to accomplish the reconnaissance and counterreconnaissance missions, he must be able to effectively direct and control them. The unit must have a structure that affects the command and control of these elements. Both commander

and staff must recognize the factors and parameters inherent to this structure.

III. INFORMATION PROCESSING AND TASK ANALYSIS

A. INTRODUCTION

The structure of armor and mechanized infantry task force command and control must be adaptable to the characteristics of certain variables that exist inside and outside the task force. Identification of these variables enables the commander to determine the most effective command and control structure for a particular situation. The commander's need for information in decision making mandates a command and control structure that facilitates information gathering and processing. The commander and staff must therefore be cognizant of the variables that are applicable when structuring the task force for reconnaissance or, in the case of denying information to the enemy, counterreconnaissance.

B. THE TASK FORCE AS AN INFORMATION PROCESSING SYSTEM

Information processing is ideally the "gathering, interpreting, and synthesis of information in the context of organizational decision making." [Ref. 25:p. 614] Information processing in the task force consists of the functions, relations, and operations that exist in order to minimize uncertainty about a particular situation. The structure of the task force command and control system affects its ability to effectively process information and deal with uncertainty.

The armor and mechanized infantry task force is essentially an organizational information processing system. Task force elements gather

information based on a particular mission or situation and then process and disseminate the information throughout the task force, and the commander uses the information to direct the combat power of the task force. An essential feature of organizational information processing is the need to share information among the commander's staff so that they may arrive at a similar interpretation of the information [Ref. 26:p. 556]. This facilitates the synchronization required for the command and control of the task force.

Another feature of the task force as an information-processing system is the requirement for a division of labor among the elements of the task force in order to accomplish a mission or task [Ref. 26:p. 556]. Division of labor is synonymous with coordination of the various elements of the task force (scouts, tank/infantry companies, GSRs, staff sections, etc.) based on their respective weapon systems, personnel, equipment, and inherent missions. In order for the task force to accomplish its mission, each element must perform its own mission or task while coordinating the task with other elements as necessary.

The activities of the task force elements join together in order to best deal with uncertainty and increase information processing. The structure of the task force elements to conduct reconnaissance missions must facilitate the collection, as well as the processing, of information within the task force. Task force counterreconnaissance force structure must also provide information processing while supplying the means to disrupt the enemy commander's own information processing system by denying or defeating his reconnaissance efforts. The design of structural relations

within the task force must be capable of dealing with its information-processing requirements during task execution.

C. TASK ANALYSIS

The critical task of the armor and mechanized infantry task force is to facilitate the collection, gathering, and processing of information about how different elements of the task force are functioning, each element's effect on the success of the mission, and conditions external to the task force itself. Any task for which the task force is responsible, however, varies in the degree of uncertainty associated with it [Ref. 27:p. 56].

Recognized simply as the absence of information, a more suitable definition of uncertainty is "the difference between the amount of information required to perform a task and the amount of information already possessed by the organization." [Ref. 26:p. 556] It is up to the commander and his staff to build the most appropriate command and control structure in order to deal effectively with task-related uncertainty. The structure must take all sources of uncertainty into account in order to establish effective information processing.

There are four primary sources of task-related uncertainty with which the task force must deal: task characteristics, task environment, inter-unit task interdependence, and technology [Ref. 25:p. 615].

1. Task Characteristics

The characteristics of a task often determine the amount of uncertainty associated with the task during its execution. Task complexity and task interdependence are characteristics of task-related

uncertainty. Each characteristic affects the information-processing requirements of the task. [Ref. 25:p. 615]

a. Task Complexity

Task complexity varies on a continuous scale between routine and complex. Routine tasks are those that the task force can preplan or address through standard operating procedures (SOPs). Because the uncertainty associated with a routine task is small, the information-processing requirements are minimal. Complex tasks are those which are not well understood or are too complicated to address in an SOP. Complex tasks require substantial information-processing requirements to deal with the increased amount of task-related uncertainty. [Ref. 25:p. 615]

b. Task Interdependence

Task interdependence is a function of the number of corresponding subtasks required to accomplish one task. As the number of subtasks required to accomplish a task increases, so does uncertainty and its associated information-processing requirements. Singular tasks, or those that consist of only a few subtasks, require minimal information-processing requirements. [Ref. 25:p. 615]

2. Task Environment

The task environment is a source of uncertainty because it consists of those areas or events that can affect the task force. The task force must establish a structure that can effectively learn about and interpret factors that are not directly under the control of the task force commander and are therefore potentially unstable [Ref. 26:p. 566]. The task

environment can be stable or dynamic, depending on how much or how fast it changes from one existing state to another. Additionally, a hostile enemy can affect the task environment and create uncertainty that the commander and staff must consider.

a. Stable Environment

A stable environment enables the task force to adequately plan or develop SOPs in order to deal with the task-related environment. A stable, unchanging environment creates less incentive to gather information because uncertainty is low. [Ref. 26:p. 566]

b. Dynamic Environment

An environment that is rapidly changing requires the task force to gather more information about the environment. In a changing environment, the task force SOPs are not able to effectively deal with the amount of environmental uncertainty. The task force must gather and process increased amounts of information to deal with the associated uncertainty. [Ref. 25:p. 616]

c. Hostility

A hostile environment is one that actively deters the task force from accomplishing its mission. The degree of hostility varies on a continuing scale from passive to very active. A hostile environment mandates significantly more time and assets to conduct reconnaissance. An active enemy creates hostility, and thus uncertainty, in the environment by attempting to disrupt task force operations. Disruptions can be in the form of changes to the shape of the environment through obstacle or

barrier emplacement, or enemy elements specifically tasked to defeat task force reconnaissance or counterreconnaissance efforts.

3. Inter-Unit Task Interdependence

A third source of task-related uncertainty is inter-unit task interdependence. Inter-unit task interdependence is the extent to which elements of the task force depend upon each other to accomplish their tasks [Ref. 26:p. 564]. This interdependence creates a source of task uncertainty that has even broader implications on information-processing structure than task characteristics or task environment.

Elements that operate autonomously have fewer requirements to coordinate their activities with other elements. Consequently, they rely very little on inter-unit task interdependence to accomplish their mission, and therefore experience less task-related uncertainty. When inter-unit task interdependence is high, the need for frequent adjustments and coordination among all elements involved increases the amount of task-related uncertainty.

High inter-unit task interdependence requires the task force to provide structural links for mutual adjustment among elements. Mutual adjustment is typically the method of coordinating a system in which "two or more decision makers without hierarchical authority with respect to one another (but are at the same level) mutually solve problems and implement solutions." [Ref. 28:p. 3] Standardization is the creation of routines that are always applied to solving problems and producing products in accomplishing a mission. Standardization is the best means of coordination in the task force structure for those tasks that require low

inter-unit task interdependence. Direct supervision is also a method of providing structural coordination within the task force. To the military, direct supervision is essentially the giving of orders. Direct supervision "creates coordination and control by internalizing the set of tasks to be coordinated in one person." [Ref. 28:p. 2]

4. Technology

Task-related uncertainty is but one factor in the process to achieve the most suitable organizational structure to accomplish a mission. Technology is another factor that affects structural design. Technology is the "tools, techniques, and actions used to transform organizational inputs into outputs." [Ref. 28:p. 13] Organizational inputs at the task force level include, but are not limited to, orders or intent from a superior commander, intelligence information from sources outside the task force, rules of engagement, standard operating procedures, and mission goals. The output that the task force commander desires is the ability to effectively bring combat power to bear against the enemy in conjunction with the received inputs. Technology serves as the means by which task inputs are synthesized in order to achieve an output. The effect of technology on the input-output relationship significantly affects organizational structure and the information processing required to accomplish a task.

There are two underlying characteristics of technology which effect organizational structure for information processing: task variety and task analyzability.

a. Task Variety

Task variety is the "frequency of unexpected or novel events that occur in the input-output process, in the technological process." [Ref. 28:p. 14] High task variety means that the commander and his staff cannot adequately predict problems or activities in advance. Low variety equates to few problems in the process of converting organizational inputs to outputs.

Tasks that contain a high degree of variety are also high in uncertainty due to the number of problems that arise during the technological process. High variety requires a great deal of mutual adjustment among various decision makers and staff sections. This is necessary to deal with the frequency of changes that occur during the technological process. Direct supervision and standardization are more appropriate to tasks that contain low variety due to infrequent changes to routine procedures during the technological process.

b. Task Analyzability

Task analyzability is the "ability to reduce the tasks to mechanical steps that participants can follow in a computational way to solve problems." [Ref. 28:p. 14] A task that is analyzable lends itself to objective, computational problem solving. A task that is not analyzable creates problems for the commander and staff in developing exact procedures that sufficiently accomplish the task. In this instance, the commander relies more on judgment and experience to accomplish the task [Ref. 26:p. 564]. The corresponding information-processing structure must provide for coordination and control through direct supervision.

Tasks that are analyzable can be addressed through SOPs and training. Standardization is a sufficient means of coordination and control for these types of tasks.

Figure 5 illustrates the four sources of task-related uncertainty which combine to influence the degree of information processing that an organization must possess [Ref. 25:p. 617]. As a task becomes more complex or interdependent, as the task environment becomes more dynamic or hostile, and as the inter-unit task interdependence becomes more complex, the task force must structure and function accordingly in order to contend with increased amounts of task-related uncertainty.

Technology, or the process of converting organizational inputs to output(s), is critical to effective information processing. Task variety and analyzability have significant effects on the task force command and control structure necessary to accomplish a task. Understanding the nature of technology helps in determining the structural characteristics of the armor and mechanized task force when given reconnaissance and counterreconnaissance missions.

D. SUMMARY

An armor or mechanized infantry task force command and control structure is essentially an information processing system. The system gathers raw data, refines it, and provides information to the commander so he can effectively direct the combat power of the task force against the enemy. The command and control structure must provide the means for coordinating information sharing and division of labor among the elements of the task force.

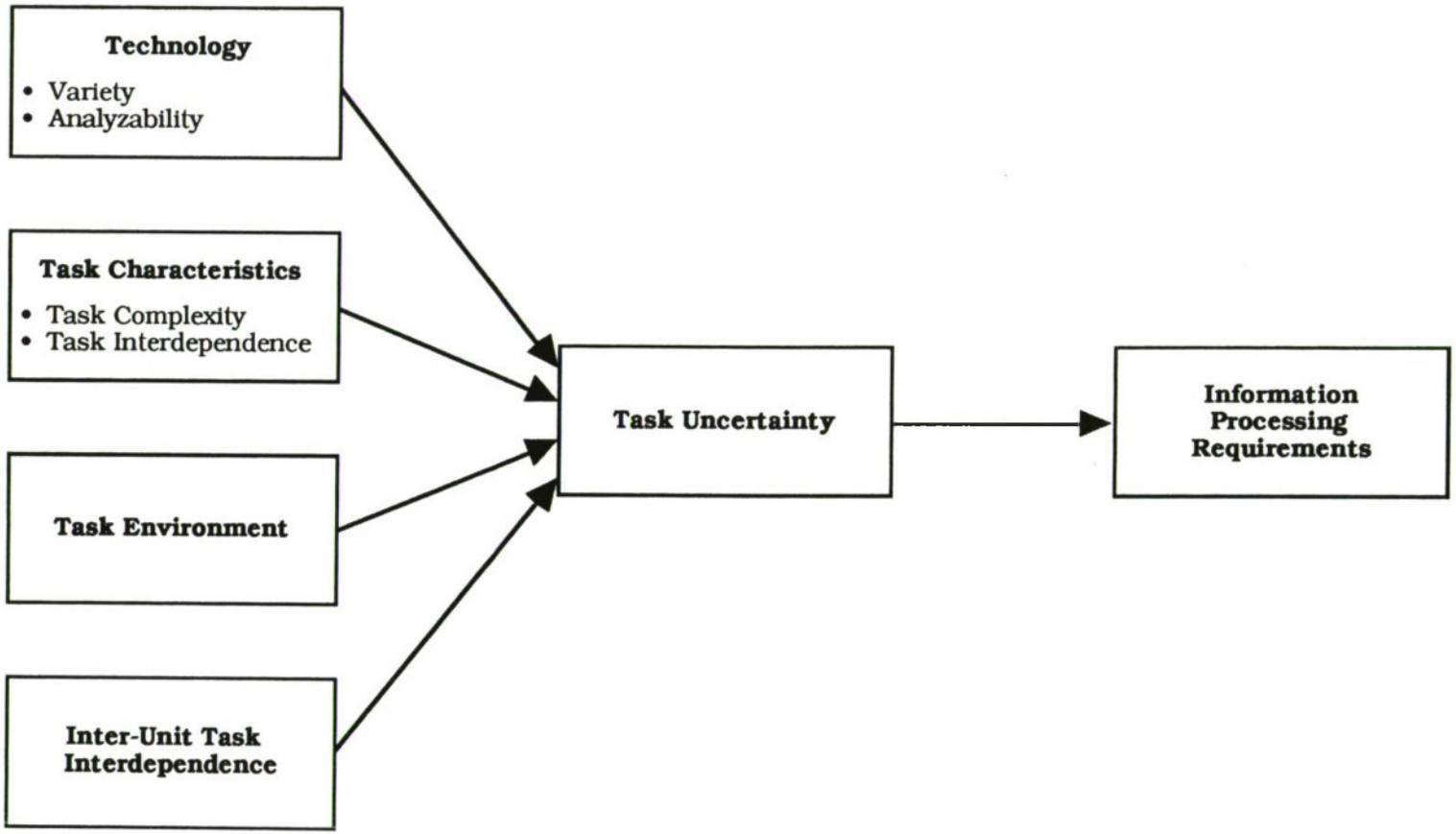

Figure 5. **Sources of Uncertainty and Information Processing Requirements**

The commander and staff must be cognizant of the sources of task related uncertainty with respect to task force missions. Reducing uncertainty in information processing should be the goal of the commander and staff when structuring the task force command and control system.

The commander must also consider technology and its impact on information processing. Task variety and task analyzability both affect the command and control structure of the task force by introducing uncertainty into the task. Each requires some sort of coordinating mechanism to overcome the uncertainty that technology introduces into information processing.

IV. STRUCTURING FOR COMMAND AND CONTROL: COMMAND AND CONTROL ARCHITECTURE FOR RECONNAISSANCE

A. INTRODUCTION

The command and control structure of the task force is essentially the organizational arrangement of personnel, equipment, and procedures that facilitates information gathering and processing and enables the commander to invoke the combat power of the task force against the enemy. The command and control structure of the armor and mechanized infantry task force exists to support the commander's decision-making process. The commander and staff analyze accumulated information in order to dissect various courses of action. Ultimately, the commander arrives at a decision that enables him to bring adequate combat power to bear at critical points on the battlefield. In order to synchronize and coordinate combat power on the battlefield, the task force must have a structure that provides the framework through which the commander communicates his intent to subordinates and supervises execution.

The structure of the armor and mechanized infantry task force has significant impact on its ability to process information and deal with uncertainty. For the reconnaissance mission, the task force organization must gather, synthesize, and disseminate information so that the commander can best direct the energy of the task force against the enemy. Counterreconnaissance in the task force area of operations must deny the enemy commander the ability to collect and process information

about task force defensive preparations. Like reconnaissance, counterreconnaissance requires a structure that effectively processes information. The two missions differ in degree of task related uncertainty and technology.

B. COORDINATING AND CONTROLLING MECHANISMS

As tasks, reconnaissance and counterreconnaissance require effective coordinating and controlling mechanisms between elements within the task force. Direct supervision, standardization, and mutual adjustment provide such mechanisms for information processing. Figure 6 illustrates a continuum of the three mechanisms based on cost, complexity, and the capacity to process information [Ref. 25:p. 618]. In general, the more complex and comprehensive the mechanisms are, the greater their capacity to process information and reduce uncertainty. Increased complexity and processing capacity create a structure that is more costly in terms of time, energy, resources, and supervisory control [Ref. 25:p. 618]. Too much information-processing capacity for a particular mission leads to high costs and redundancy, while too little capacity does not adequately reduce uncertainty. It is up to the task force commander and staff to determine the correct balance of complexity, cost, and capacity when structuring the task force coordinating mechanisms for reconnaissance and counterreconnaissance missions. The commander's ultimate goal is to match information processing requirements with the information processing capacity of the task force structure.

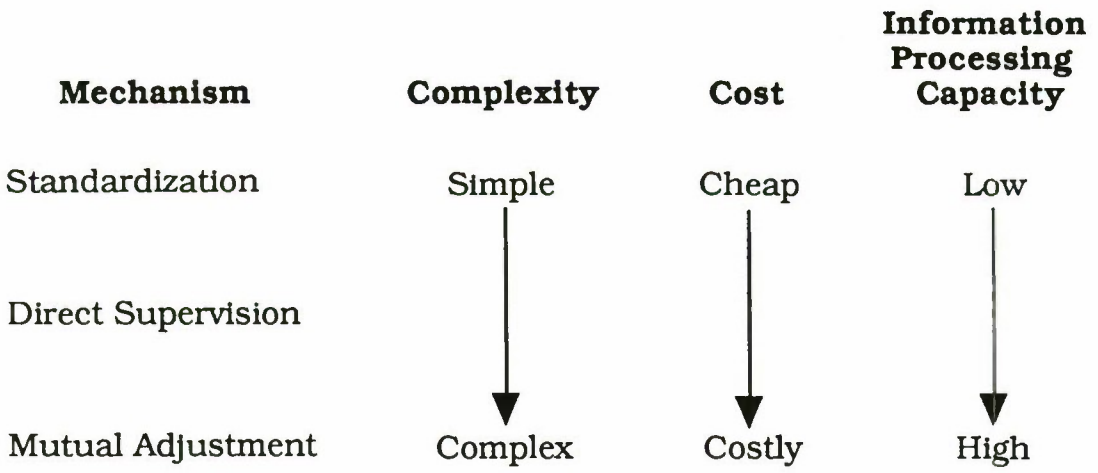

Figure 6. **Mechanisms for Coordination and Control**

C. ELEMENTS OF COMMAND AND CONTROL DESIGN WITHIN THE TASK FORCE

Resource limitations exist in the armor and mechanized infantry task force during the execution of either reconnaissance or counter-reconnaissance. The primary resources in the task force consist of human decision makers, human information processors, and equipment. These resources occupy functional positions within the task force structure known as "organizational positions." Organizational positions within the task force are responsible for executing a function or task. The following organizational positions are representative of the resources available when structuring the task force for reconnaissance or counterreconnaissance.

1. Decision Makers

Decision makers exist throughout the task force by virtue of their hierarchical position and responsibility. Decision makers are those individuals who possess the technical skills and knowledge to analyze information and direct that a certain subsequent action be taken. In the task force, the task force commander is the primary decision maker. Company/team commanders, primary staff officers, and specialty platoon leaders (scout, mortar, support, medical platoons) are secondary decision makers who act within the guidelines of the commander's intent and established rules of engagement.

2. Information Processors

Human information processors are organizational positions that convert data inputs into information outputs. Information processors take raw data, often from many sources, and synthesize it into meaningful information for a decision maker. Information processors within the task force consist of staff sections or leaders (decision makers) that have the requisite skill and training to perform this function.

3. Individual Positions

Individual positions execute some function in support of the task force as a whole. Individual positions in the task force consist primarily of weapon systems (tanks and Infantry Fighting Vehicles) and information-gathering systems or sensors (e.g., scout squads, GSRs, individual soldiers, fighting vehicles). Weapon systems typically execute the commander's concept of directing energy against the enemy.

Information-gathering systems gather raw data and provide it to information processors within the task force.

D. RECONNAISSANCE TASK ANALYSIS

Having a firm understanding of the task or mission at hand is essential when designing a respective command and control architecture. Task analysis enables the commander and staff to determine the amount of uncertainty inherent in reconnaissance. In order to establish the degree of uncertainty in reconnaissance, the commander and staff must evaluate the task in terms of four variables: task characteristics, task environment, inter-unit task interdependence, and technology. Once accomplished, the commander can establish the coordinating mechanisms and command and control elements necessary to accomplish the task.

1. Reconnaissance Task Characteristics

Reconnaissance is typically a complex task. The command and control structure to conduct and coordinate reconnaissance is a consequence of the following variables:

- The task force mission (which determines the number of reconnaissance subtasks that the task force must accomplish);
- The environment, which consists of:
  - ◊ The enemy situation;
  - ◊ The amount of terrain that the task force must reconnoiter;
- The amount of time available to accomplish the reconnaissance; and
- The number of elements that the task force commander assigns to conduct the reconnaissance.

Each variable complicates the process by which the task force commander and staff plan and ensure accomplishment of the reconnaissance mission. When combined, these variables create a task that is complex and high in relative uncertainty.

The reciprocal task interdependence of the reconnaissance mission also creates a high degree of uncertainty. Reconnaissance is made up of multiple subtasks that the unit must typically accomplish in a short period of time. In a 1987 RAND study on reconnaissance at the National Training Center, the author lists several primary subtasks that a task force should accomplish when conducting reconnaissance:

- Locate enemy positions and the enemy reconnaissance screen;
- Establish OPs overlooking the task force objective;
- Direct artillery fire against the enemy;
- Locate obstacles;
- Breach and mark obstacles;
- Conduct route trafficability assessment and terrain reconnaissance;
- Assist in command and control during the attack; and
- Maintain timely communications (reporting). [Ref. 4:pp. 22-23]

Each primary subtask is subsequently made up of many other secondary subtasks. The multi-layer task relationship and high degree of task interdependence create considerable uncertainty in the reconnaissance mission.

2. Reconnaissance Task Environment

Terrain and degree of hostility are the primary variables that establish an inherently dynamic reconnaissance task environment. The

terrain on which reconnaissance forces must operate is generally well forward of the task force. As a result, reconnaissance forces often see the terrain for the first time as they execute their mission. Changes in the terrain encountered by reconnaissance forces are functions of the reconnaissance force location and variable weather conditions. Vehicle traffica-bility can change drastically as weather conditions vary. Unfamiliar terrain and adverse weather contribute significantly to the uncertainty in the reconnaissance environment.

Unknown enemy strength and location also create uncertainty in reconnaissance. Enemy measures to combat the reconnaissance effort complicate the reconnaissance task. Enemy efforts to manipulate the terrain to their advantage through use of obstacles and hidden vehicle fighting positions create additional uncertainty with which the reconnaissance force must deal.

3. Inter-Unit Task Interdependence

Inter-unit task interdependence between reconnaissance elements increases as the number of interdependent reconnaissance subtasks becomes greater. Consequently, the commander must consider augmenting the scout platoon as the number of required subtasks increase. Some elements that the task force commander may augment the scouts with include:

- Ground Surveillance Radar (GSR). The GSR assists scouts in locating enemy counterreconnaissance forces. GSR can assist scouts as they navigate under conditions of limited visibility. GSR can also provide a relay or retransmission station for communications between the reconnaissance elements and the task force headquarters.

- Engineers. Task force engineers can assist scouts in obstacle breaching, route classification, and terrain analysis.
- Infantry. Infantry can help scouts in locating and marking infiltration routes for dismounted attacks. Infantry can conduct route reconnaissance along the intended task force axis of advance. [Ref. 4:pp. 23–24]

Devoting more elements to perform reconnaissance subtasks causes an increase in inter-unit task interdependence and thus uncertainty. As size of the the reconnaissance force increases and becomes more diverse, the commander and staff must establish coordinating mechanisms that facilitate information sharing and mutual problem solving. These mechanisms are necessary to assuage the increase in task-related uncertainty.

4. Technology

Task variety in reconnaissance is high because the commander and staff cannot adequately predict task-related problems that may occur. High task variety is attributable to reconnaissance assets that break down, become lost, or are engaged by the enemy. Losing communications with reconnaissance elements due to distance or terrain is a common occurrence during reconnaissance missions [Ref. 6:p. 7]. The extended distances associated with reconnaissance missions makes it difficult to adjust to unforeseen problems.

At first glance, it seems that the technology associated with reconnaissance is analyzable. Field Manual 17-98 (*Scout Platoon*) and Mission Training Plan 17-57-10 provide excellent sources of doctrinal guidance for the execution of reconnaissance missions [Ref. 29:p. 4]. In a stable environment, doctrine provides the technology to effectively

conduct reconnaissance. The high uncertainty in the reconnaissance environment, however, does not lend itself to objective, computational problem solving. The dynamic nature of reconnaissance requires decision makers to rely on judgment and experience in order to resolve the problems associated with planning and executing the task. Leader training provides the experience necessary to conduct effective reconnaissance operations.

The task characteristics, task environment, inter-unit task interdependence, and technology of reconnaissance combine to make it a complex and dynamic task of high uncertainty. The inability to predict the problems associated with conducting reconnaissance requires decision makers in the command and control structure to use judgment and experience rather than standardized routines to respond to problems. By analyzing the reconnaissance task, the commander and his staff are able to structure the task force to effectively deal with the uncertainty of the task itself.

E. RECONNAISSANCE COMMAND AND CONTROL ARCHITECTURE

The armor and mechanized infantry task force requires a command and control structure that can gather and process a large amount of information in order to reduce the high uncertainty associated with reconnaissance. When designing the correct structure, it is essential that the commander and staff first identify the assets and coordinating mechanisms that are essential to the reconnaissance task. The commander and staff should conduct a systematic task analysis of the reconnaissance task based on the present and possibly future state of the task

variables in order to determine the necessary assets and coordinating mechanisms.

Upon completion of the task analysis, the commander and staff must then identify and prioritize reconnaissance subtasks (from paragraph D.1.) which are fundamental to the success of the task force mission. The priority given to each subtask may vary in accordance with how much information is known about the enemy and the environment.

The commander and staff must then define specific collection subtasks for the scout platoon. Since most effective scout platoons obtain detailed combat information through stealthy dismounted patrolling and stationary observation, it is essential that the scouts be given sufficient time to accomplish their subtasks [Ref. 6:p. 8]. Should the time required to accomplish the subtasks exceed the time available, the commander must then look beyond the scout platoon for reconnaissance assets. Assets that augment the scout platoon should be given only those subtasks that they can be reasonably expected to accomplish.

As the reconnaissance force takes shape, the commander and staff must determine the coordinating mechanisms essential to processing information and reducing uncertainty. Analysis of inter-unit task relationships and technology within the force assists in determining the appropriate coordinating mechanisms.

The task force headquarters organization design is essential to the success of the reconnaissance effort as well. In doctrine and practice, the individual positions in the headquarters organization are stable [Ref. 30:p. 131]. The coordinating mechanisms that the headquarters

organization establishes, however, are not fixed. Coordinating mechanisms between elements in the headquarters organization assist the reconnaissance force by synchronizing task force support assets. Decision makers within the organization provide direction to the reconnaissance force [Ref. 6:p. 7]. The locations of both are subject to change depending on the uncertainty of and required technology for the task at hand.

The following command and control structure for reconnaissance utilizes only those assets that are organic or traditionally attached to a typical armor and mechanized infantry task force. The allocation of task force assets to each subtask is an example of what a commander might appropriate to each, but this is by no means the only possible combination. The intent is to present a structure that effectively reduces the uncertainty of the reconnaissance mission and lends itself to efficient information processing.

1. Reconnaissance Organization

The typical reconnaissance organization consists of those assets that gather, process, and communicate information to secondary decision makers. The commander and staff array the assets in accordance with the subtasks that each must execute. Because of the complex nature of reconnaissance, it is best to divide the task into horizontally specialized subtasks that are "narrow" in scope. As a result, the most appropriate organization for reconnaissance is one that "groups" assets in accordance with the subtask(s) that they must accomplish. The

demands of each subtask may require the commander to combine various task force assets.

Dividing the reconnaissance organization (Figure 7) into three teams (A, B, and C) enables the commander to adequately address the subtasks that are typical of the reconnaissance task. Each team is responsible for conducting specific reconnaissance subtasks. All three teams are under the direction of a decision maker who is responsible for the execution of various subtasks.

Figure 8 depicts the communications network of the task force headquarters and reconnaissance organizations. The scout platoon leader and platoon sergeant receive direction from the task force headquarters, usually the task force S-2 and S-3, on the task force command frequency. The platoon leader and platoon sergeant send processed information to the headquarters on the task force command frequency. The elements of the reconnaissance force communicate with one another by radio on the scout platoon frequency. The GSR section communicates using its own frequency, with only the section leader responsible for maintaining communication with the scout platoon leader on the scout platoon frequency. [Ref. 6:pp. 6, 8]

The platoon leader, platoon sergeant, and GSR section leader are responsible for directing the effort of their respective teams while retaining the capability, through mutual adjustment, to react quickly to variety and environmental uncertainty. By dividing the reconnaissance task into manageable subtasks, the commander is able to reduce task

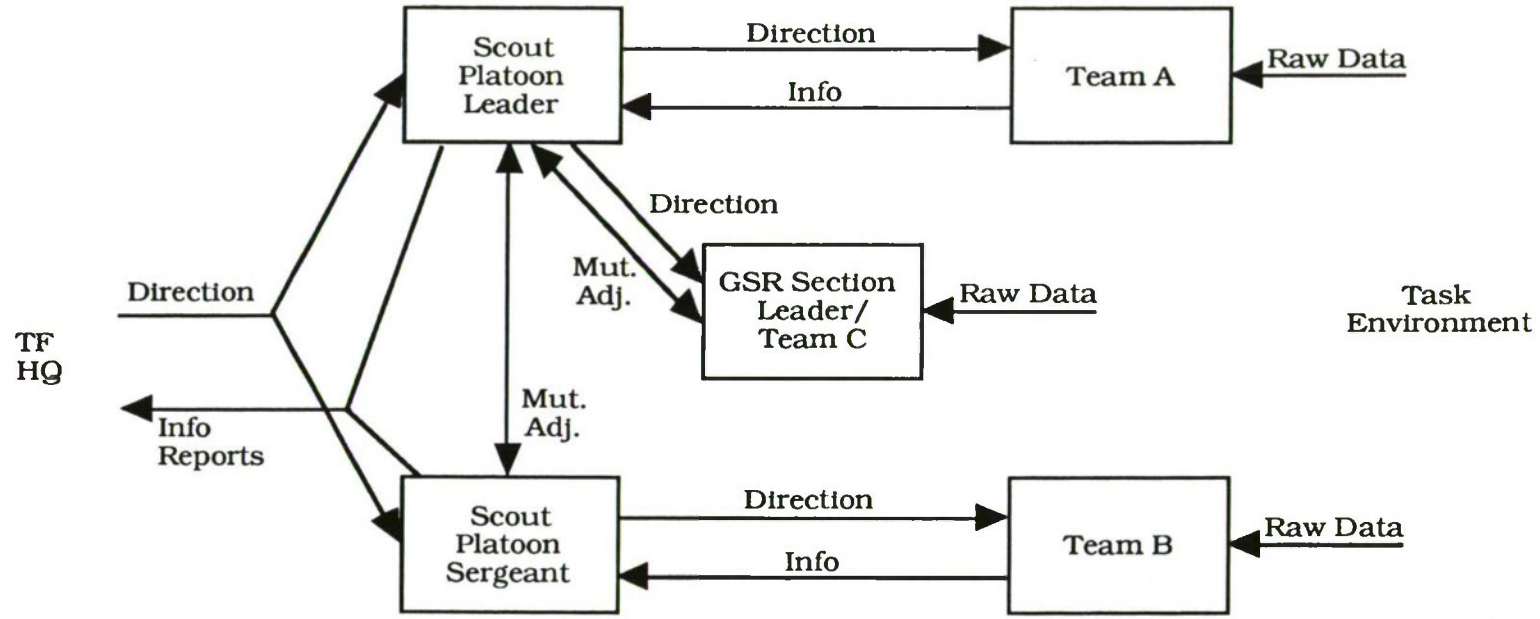

Figure 7. **Reconnaissance Organization**

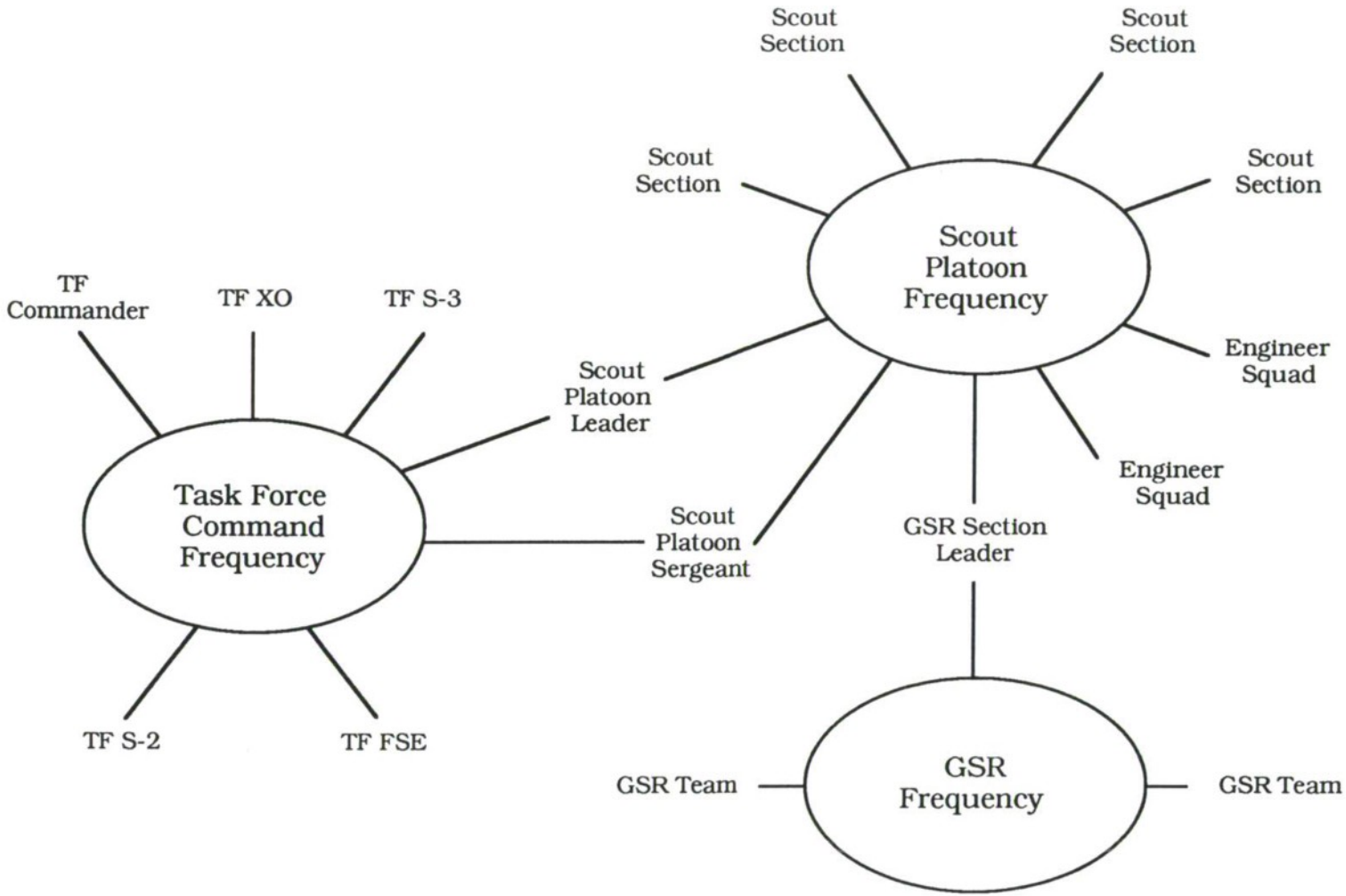

Figure 8. **Communications Network for Reconnaissance**

complexity and better manage inter-unit task interdependence. The end result is reduced uncertainty and increased information-processing capacity.

a. Team A

Team A (Figure 9) is under the direction of the scout platoon leader. The team is responsible for conducting reconnaissance of the task force objective as well as locating enemy defensive positions and the enemy counterreconnaissance screen. The team must establish observation posts that are capable of keeping all three under constant surveillance.

(1) Individual Positions. The individual positions in Team A are the scout platoon leader and three scout sections. Each scout section (two HMMWVs, one motorcycle, and six scouts) consists of two scout squads (see Figure 4 in Chapter II). The scout section primarily gathers raw data about the objective and the enemy. The limited number of team subtasks provide the sections the time they require to utilize deliberate movement techniques and dismount when necessary. Platoon and individual training adequately prepares each section leader to direct artillery fire against the enemy, one of the reconnaissance subtasks, as well.

The scout platoon leader provides command and control for Team A. His squad conducts supplementary observation of the task force route of attack while assisting in the movement of the task force. As a scout, the platoon leader is also capable of directing artillery against the enemy.

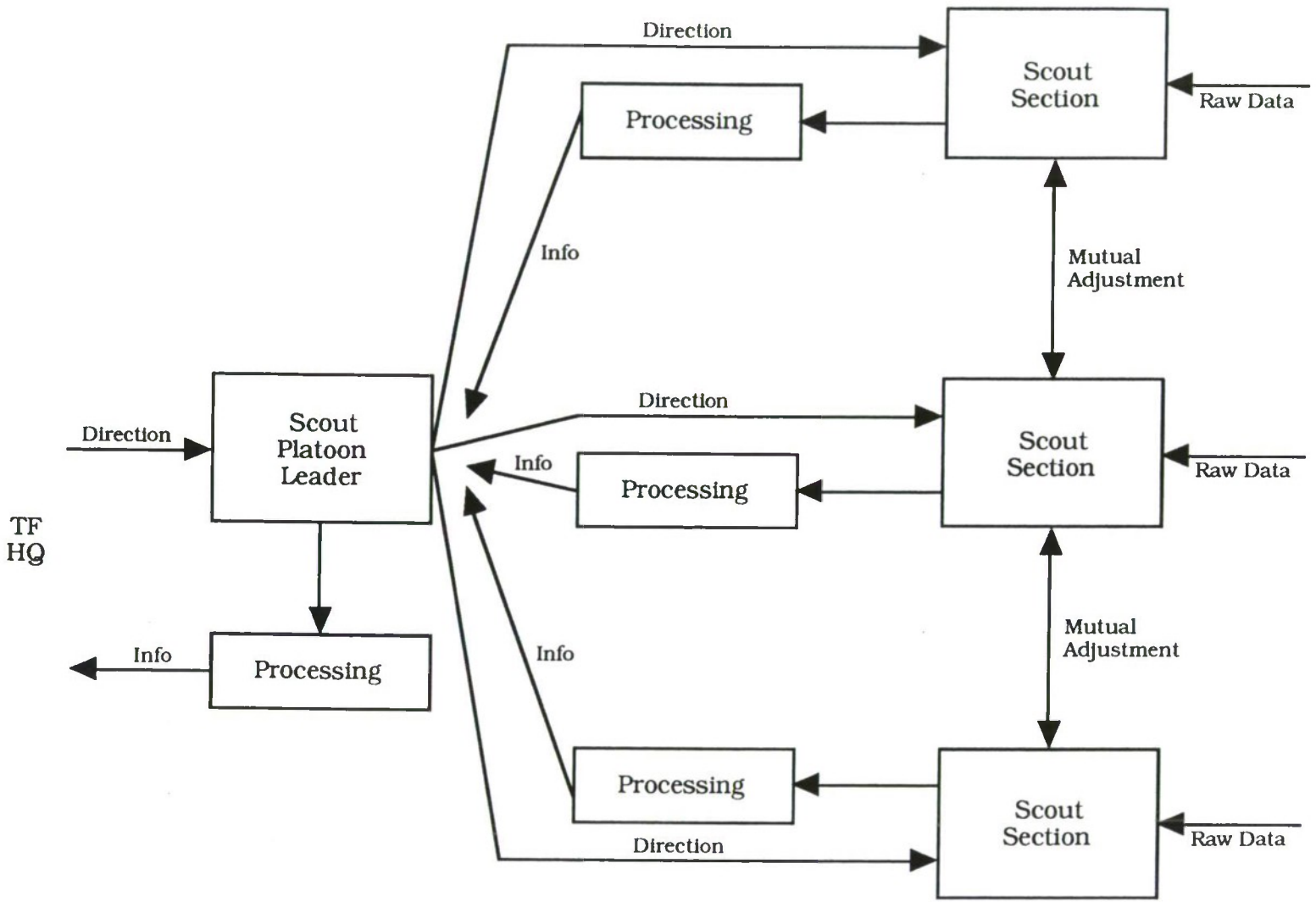

Figure 9. **Reconnaissance Organization: Team A**

(2) Information Processing. Information processors synthesize the raw data collected by the scouts into meaningful information for a decision maker. Information processors in Team A are the scout section leaders and the scout platoon leader. As the scout squads locate and observe both the objective and the enemy (raw data), the section leaders convert the observations into reports. The reports are then sent to the scout platoon leader on the scout platoon frequency.

The scout platoon leader refines the information given to him by the section leaders and sends it to the task force headquarters on the task force command frequency. Transmitting on the command frequency helps to reduce uncertainty by "providing most of the task force with an appreciation of the situation ahead." [Ref. 6:p. 8]

(3) Decision Makers. The primary decision maker for Team A is the scout platoon leader. The scout platoon leader directs the reconnaissance effort of Team A, ensuring that the scout sections act within the task force commander's intent and established rules of engagement. The scout section leaders act as secondary decision makers. The section leaders can make decisions that require immediate action but are otherwise limited in authority and rely on the task force commander's intent and scout platoon leader's guidance for direction.

(4) Coordinating Mechanisms. By virtue of unknown terrain and enemy locations, the team must operate in an environment of high uncertainty. High task uncertainty is also a result of the complex nature of the reconnaissance task and the commander's need for considerable information. Mutual adjustment (see Figure 6) facilitates

information sharing and mutual problem solving between the scout sections. Operating on the same radio frequency allows the section leaders to coordinate through mutual adjustment and thereby reduce uncertainty. Should the reconnaissance effort become disrupted through enemy contact, the scout platoon leader can make immediate adjustments of which all sections will be aware.

Inasmuch as the technology needed to conduct the reconnaissance task is not analyzable, the scout platoon leader provides direct supervision to the section leaders. By virtue of his training and experience, the platoon leader is able to determine the proper techniques and methods that will guide the effort of the team toward successful completion of all reconnaissance subtasks.

b. Team B

Team B (Figure 10) is under the control of the scout platoon sergeant. The team is responsible for conducting the following reconnaissance subtasks: locate and breach enemy obstacles, conduct route trafficability and terrain assessment, and conduct route reconnaissance. The team supports the task force movement along the axis of advance and through any breach sites.

(1) Individual Positions. The individual positions in Team B are the scout platoon sergeant, one scout section, two engineer squads, and one infantry squad. The scout section consists of two HMMWVs, one motorcycle, and six scouts. Each engineer squad is composed of one M113 Armored Personnel Carrier (APC) and eight combat

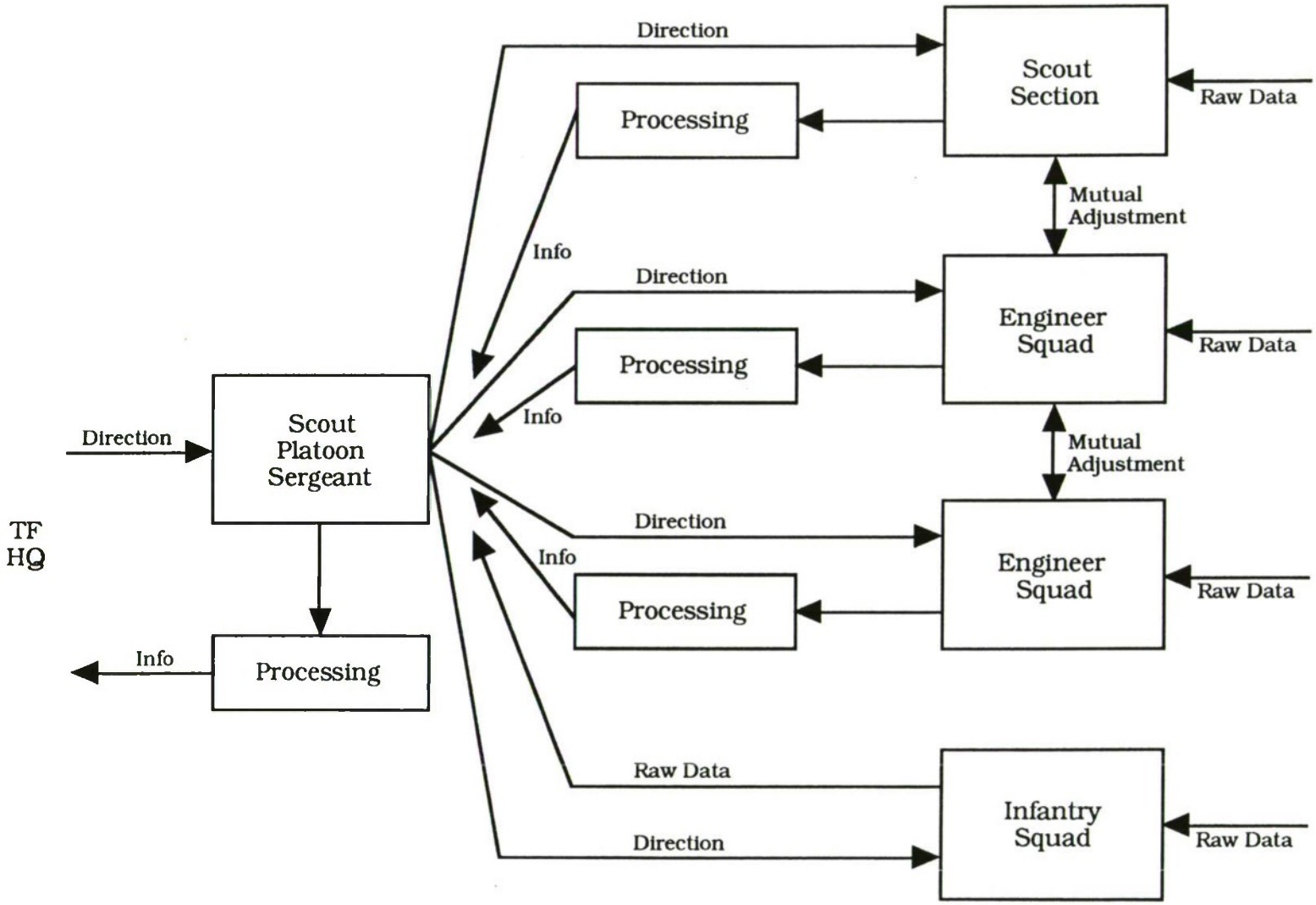

Figure 10. **Reconnaissance Organization: Team B**

engineers. The infantry squad consists of one M2 Infantry Fighting Vehicle (IFV) and nine squad members.

The scout section and the engineer squads are responsible for gathering raw data about enemy obstacle locations and determining possible breach sites. As they maneuver along the task force axis of advance, the scouts and engineers conduct a terrain assessment to determine trafficability. The infantry squad is responsible for reconnaissance of the task force axis of advance to ensure that it is clear of obstacles and enemy forces. Limiting the number of subtasks that each team element is to perform assists in further simplifying the reconnaissance task and reducing task uncertainty.

The scout platoon sergeant provides command and control for Team B. Like the platoon leader, the platoon sergeant maintains observation of the task force axis of advance and supports the movement of the task force. The scout platoon sergeant, scout section leader, engineer squad leaders, and infantry squad leader are capable of directing artillery fires against the enemy as well.

(2) Information Processing. The engineer squad leaders, scout section leaders, and the scout platoon sergeant are capable of processing raw data into information. As the engineer squads and the scout section locate obstacles (raw data), they must determine each obstacle's composition, length, and width; the existence of enemy coverage; and breaching requirements (information processing). The engineer squad or scout section leaders transmit the information to the scout platoon sergeant on the scout platoon frequency. The infantry squad must send its

data to the scout platoon sergeant for processing. The platoon sergeant refines the information and reports it to the task force headquarters on the task force command frequency.

(3) Decision Makers. The primary decision maker for Team B is the scout platoon sergeant. The scout section leader, engineer squad leaders, and infantry squad leader are secondary decision makers. As the primary decision maker, the platoon sergeant directs the reconnaissance effort of the team by providing direction to the scout section leader, the engineer squad leaders, and the infantry squad leader. Like the platoon leader, the platoon sergeant guides the team within the scope of the commander's intent and the task force rules of engagement. The secondary decision makers can make decisions that directly affect their section or squads in situations that demand immediate action.

(4) Coordinating Mechanisms. Team B relies on mutual adjustment between the scouts and engineers to reduce uncertainty caused by inter-unit task interdependence and the task force commander's increased need of information (see Figure 6). Operating on a common radio frequency (scout platoon frequency) allows the scouts and engineers to remain aware of what each is doing at any specific point during the reconnaissance. Providing this capability enhances coordination and subtask execution. The platoon sergeant provides direct supervision to the infantry squad in order to coordinate its activities with respect to team subtask responsibilities. The squad does not require mutual adjustment with the rest of the team due to the distinct nature of

its subtask. The platoon sergeant provides assistance to the infantry squad as needed.

c. Team C

Team C (Figure 11) consists of a GSR section of two teams. Each team has three soldiers, one AN/PPS-5 radar, and an M113 APC. The GSR section maneuvers to the rear or flanks of the forwardmost reconnaissance elements. The section is responsible for conducting radar surveillance ahead of the scout platoon as the platoon moves toward the task force objective. The GSRs attempt to locate the enemy counterreconnaissance force as well as vehicle concentrations that are indicative of enemy defensive positions.

(1) Individual Positions. The individual positions in Team C are the two GSR teams, one of which is led by the section leader. The section gathers raw data through continuous all-weather battlefield surveillance. The GSR section has a supplementary mission to provide communications relay or retransmission from Teams A and B to the headquarters organization.

(2) Information Processing. The GSR teams act as their own processors of raw data. Well-trained teams are capable of detecting targets by type and providing accurate range and azimuth readings to each. The section leader reports the processed data to both the scout platoon leader and platoon sergeant on the platoon frequency.

(3) Decision Makers. The primary decision maker for Team C is the scout platoon leader. Since the GSR section is attached to

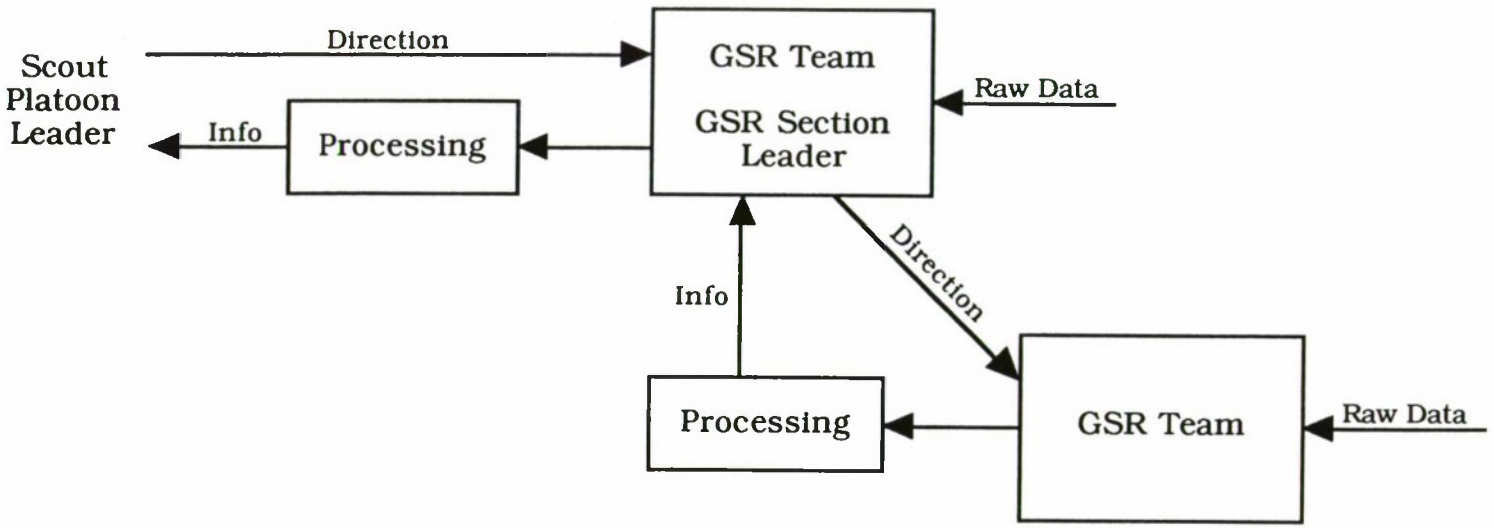

Figure 11. **Reconnaissance Organization: Team C**

the scout platoon for the reconnaissance task, the platoon leader is responsible for its employment [Ref. 15:p. 6-41]. The GSR section leader is the secondary decision maker for the section. The section leader makes decisions regarding alternate positions for the GSR teams, displacement criteria, and technique of radar coverage due to enemy direction-finding and jamming.

(4) Coordinating Mechanisms. Operating on the same radio frequency provides the section with common information and the ability to conduct the mutual adjustment essential to coordinating the radar surveillance effort. The section leader receives direction from the scout platoon leader in order to coordinate GSR capabilities with the efforts of Teams A and B. Mutual adjustment between the GSR section leader and both the scout platoon leader and the platoon sergeant reduces inter-unit task interdependence uncertainty. Transmitting GSR detections on the scout platoon frequency alerts Teams A and B to possible enemy locations and reduces the possibility of their blundering into the enemy counterreconnaissance element.

2. Headquarters Organization

The task force headquarters organization (Figure 12) consists of the elements in the task force headquarters that receive reports from the reconnaissance force, refine the information, and disseminate it to the commander, higher headquarters, and the remainder of the task force. Information is used by the commander to make decisions that will "pull" the task force main body to the objective along the path of least resistance.

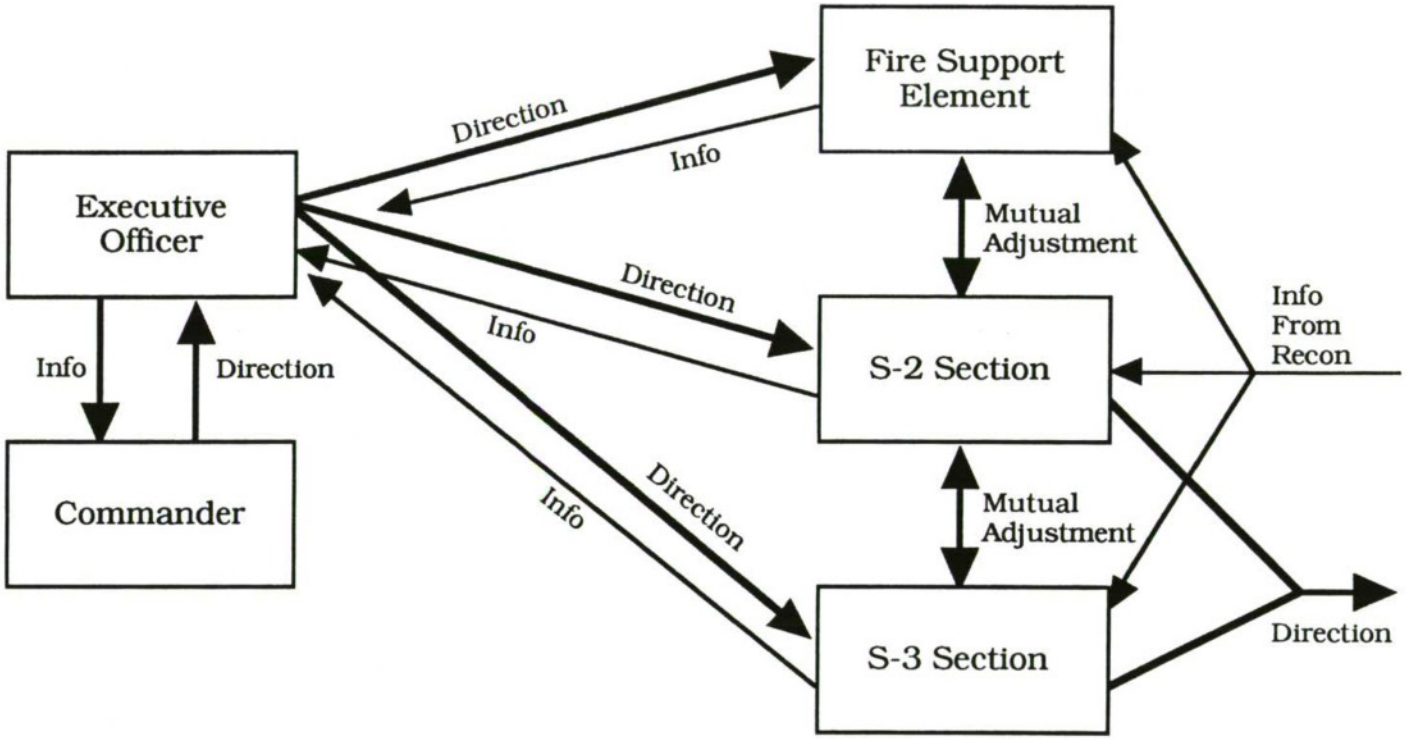

Figure 12. **Headquarters Organization**

a. Individual Positions

The S-2 and S-3 staff elements and the task force executive officer (XO) are the principal individual positions within the task force headquarters organization. All three ensure that the commander's reconnaissance goals are met by the reconnaissance force. The XO is the task force second in command (2IC). The XO is responsible for synchronizing the actions of the task force staff elements.

The S-2 and S-3 staffs ensure that the reconnaissance force operates in accordance with the commander's intent and established rules of engagement. The task force S-2 is responsible for planning and coordinating the reconnaissance and surveillance plan within the scope of the commander's guidance. The task force S-3 tasks the plan to subordinates and monitors the execution of the reconnaissance task. Both the S-2 and S-3 generate requests for information in order to confirm or deny the S-2's Intelligence Preparation of the Battlefield (IPB). The S-3 refines the task force operations plan based on the accuracy of the S-2's intelligence estimate [Ref. 31:p. 16]. The task force Fire Support Element (FSE) monitors the reconnaissance effort in order to confirm the task force fire support plan. The Fire Support Officer (FSO) plans and executes the reconnaissance force's indirect fire (direct support artillery and organic task force mortars) support plan.

b. Information Processing

The S-2 and S-3 work collectively to refine the S-2's IPB based on the information and reports sent by the reconnaissance force. The S-2 uses information from the reconnaissance force to confirm his

terrain analysis and estimate of the enemy situation. The S-3 uses the information to plan various courses of action for the task force mission. Once the commander decides on a course of action, the S-3 uses information from the reconnaissance to refine the task force scheme of maneuver. Both the S-2 and S-3 are responsible for processing the reports from the reconnaissance force into reports for higher headquarters.

The FSE uses information from the reconnaissance to devise a fire support plan for the task force mission. The FSE responds to reports of enemy locations by requesting indirect fires from the task force mortar platoon or the direct support artillery unit.

c. Decision Makers

The task force commander is the primary decision maker within the task force. The commander makes decisions concerning the task force concept of operation based on information collected from the reconnaissance force. The task force S-2, S-3, and FSO are secondary decision makers. As the primary staff officer for each staff element, all three are responsible for making decisions that are within their area of responsibility and the commander's guidance. The importance of information to each staff element requires their active participation in the reconnaissance operation. [Ref. 6:p. 7]

The task force executive officer (XO), by virtue of his position in the headquarters organization, is also a secondary decision maker. The XO typically makes decisions that coordinate the actions of the entire task force staff. However, as second in command of the task

force, he can exercise decision-making authority over a single staff element as well.

d. Coordinating Mechanisms

Mutual adjustment exists among the staff sections to ensure that the intelligence and maneuver aspects of the task force mission are coordinated. The mutual adjustment is essential to minimize the uncertainty of inter-unit task interdependence that exists between the staff elements.

The FSE and the S-2 coordinate through mutual adjustment to minimize task complexity and inter-unit task interdependence. The intelligence information gathered and reported to the S-2 provides the FSE with fresh target information. The FSE must consider the locations of the reconnaissance force while planning for the displacement of indirect fire support units so that they can range forward of the reconnaissance force [Ref. 6:p. 8]. Restricted Fire Areas (RFA) are planned by the FSE and coordinated with the S-2 to prevent the reconnaissance force from being killed by preplanned artillery and mortar fires.

The task force commander and XO provide direct supervision to the staff elements in the headquarters organization. The XO supervises the efforts of the staff to ensure that they adequately support the reconnaissance force. The XO helps to reduce task variety by coordinating the forward positioning of service support assets capable of responding to unforeseen events and the needs of the reconnaissance force. The commander provides direction to the staff based upon his guidance from the task force's parent headquarters. The task force

commander's initial planning guidance allows the staff to perform their estimates and determine what information they will need to confirm or refute the assessments.

Figure 13 depicts the task force as it is organized to conduct the reconnaissance mission. The headquarters organization determines the subtasks that the reconnaissance organization must execute and communicates them to the scout platoon leader in the form of mission statements, commander's intent, and rules of engagement. The reconnaissance organization gathers and processes information about the enemy and the task force area of operations in accordance with the direction provided by the headquarters organization. The scout platoon leader and platoon sergeant communicate this information to the headquarters organization using the task force command frequency. The GSR section leader provides communications retransmission when needed.

The staff uses the information from the reconnaissance organization to confirm their estimates of the situation and reduce the uncertainty of the task force mission. Coordination through mutual adjustment and direct supervision ensures that task uncertainty and variety are kept to a minimum within the task force headquarters organization. The elements of the staff at the task force headquarters organization analyze and refine (processing) this information in order to support each of their internal needs. The task force staff also sends the information to the higher headquarters staff in the form of reports.

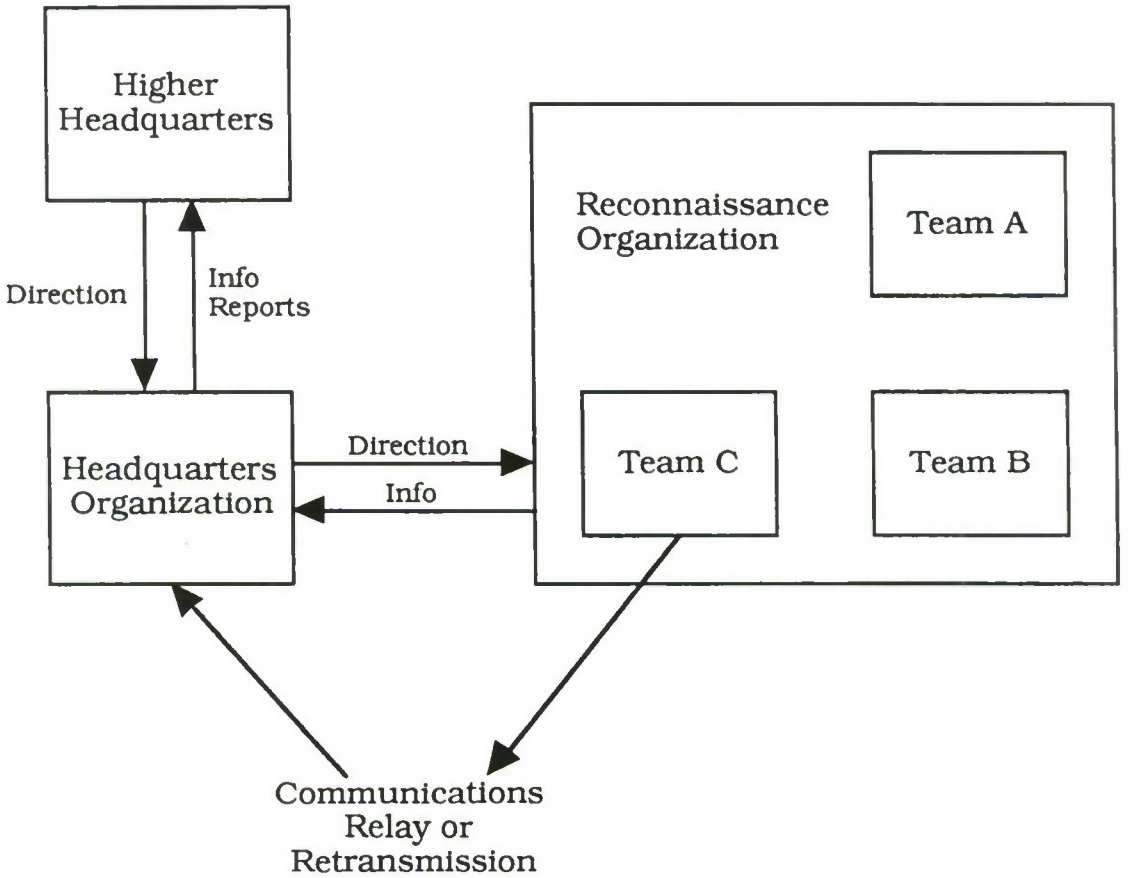

Figure 13. **Top-Level Organization for Reconnaissance**

F. SUMMARY

The task force command and control structure supports the commander in the decision-making process. The structure serves as an information-processing system that enables the commander to effectively direct the combat power of the task force against an enemy.

Direct supervision, mutual adjustment, and standardization provide coordinating and controlling mechanisms in the task force to facilitate information processing. The commander must determine the correct mix

of these mechanisms based on their cost, complexity, and information-processing capacity. The commander must balance the information-processing requirements of the task force with the information-processing capacity within the task force structure.

The high degree of task uncertainty and variety associated with the reconnaissance task requires a structure that can reduce the interdependence and complexity of the task. The commander can reduce the complexity of the collection effort by dividing reconnaissance into subtasks. The task force S-3 can then assign the appropriate assets to each subtask. After building the reconnaissance force around the subtasks, the commander and staff must ensure that the necessary coordinating mechanisms are in place. Mutual adjustment and direct supervision within the structure provide the mechanisms to deal with the unanalyzable technology and high inter-unit task interdependence uncertainty. The structure of the task force headquarters must take the same task variables into account. While individual positions within the headquarters do not deviate from established doctrine, the structure must contain the coordinating mechanisms necessary to reduce uncertainty.

The fact that the task force faces different conditions over time requires that the structure of the task force be modified to meet the changed information-processing requirements. Structuring the task force to accomplish different tasks is a dynamic process that is never fully accomplished. As the information-processing requirements of a task change, so too must the task force structure. This is especially true in the case of reconnaissance and counterreconnaissance. The inherent

differences between the two demands a distinct structure to successfully accomplish each mission.

V. C^2 ARCHITECTURE FOR COUNTERRECONNAISSANCE

A. INTRODUCTION

Unlike reconnaissance, counterreconnaissance is not routinely a task or mission for which a commander may structure his command and control. Instead, it is the aggregation of all actions taken by the task force at each echelon in order to counter enemy reconnaissance efforts. Companies are capable of conducting counterreconnaissance by virtue of the patrols they conduct and the observation posts that they plan and occupy. Individual soldiers conduct counterreconnaissance by vigilantly watching over their assigned area of observation. Therefore, counterreconnaissance is the requirement of every soldier, vehicle crew, and unit in the task force throughout the depth of the area of operations.

Perhaps the most important aspect of counterreconnaissance is the "screen," a task for which the commander can structure his forces and coordinating mechanisms. The task force screen is typically a force that "provides early warning of enemy approach" as well as "real time information, reaction time, and maneuver space for the main body" of the task force [Ref. 15:p. 4-17]. According to Field Manual 101-5-1 (*Operational Terms and Graphics*), a screening force "maintains surveillance, provides early warning to the main body, impedes and harasses the enemy with supporting indirect fires, and destroys enemy reconnaissance elements within its capability." [Ref. 17:p. 1-64] The task force scout platoon is capable of conducting a screen that provides early warning to

the task force and uses indirect fire to hinder the maneuver of enemy reconnaissance assets. The limited direct-fire capability of the scout platoon, combined with the commander's desire to preserve his "eyes and ears," restricts the platoon from engaging in direct combat with enemy reconnaissance patrols.

The limitations of the scout platoon in conducting an effective screen against a sizeable and potent enemy reconnaissance force require the commander to augment the scouts with a force that is capable of killing enemy reconnaissance assets [Ref. 32:p. 6]. A reaction force is necessary in order to destroy enemy reconnaissance as it is observed and reported by the scout platoon [Ref. 6:p. 10]. The reaction force can take on many shapes and sizes, but it must be capable of dealing with the assets that the enemy commander devotes to reconnaissance.

The commander must determine the appropriate mix of task force assets that can gather raw data about the enemy reconnaissance effort, process the data into useable information, and subsequently defeat the enemy reconnaissance force forward of the task force battle position. The commander must identify the mechanisms that enable the screening force to coordinate its effort against the enemy. To do this, the commander must conduct a task analysis of the screen mission in order to identify the size of the force and the coordinating mechanisms required to execute the task.

B. SCREEN TASK ANALYSIS

The commander and his staff conduct a task analysis of the screen mission in order to determine its associated degree of uncertainty. The

commander and staff analyze the task in terms of its characteristics, environment, inter-unit task interdependence, and technology so that they may determine where and to what extent task uncertainty exists.

1. Screen Task Characteristics

The screen task is a relatively routine task in terms of task-related uncertainty. The flexibility associated with the screen allows the commander to quickly emplace the screen force [Ref. 6:p. 13]. Quick positioning provides the force time to conduct an extensive terrain analysis of an area that is typically small in terms of width and depth. Given more time to cover less space, the commander and staff can easily improve the composition of the screening force as the enemy situation unfolds. The increase in time and subsequent familiarity with the environment, combined with the flexibility that the commander has in positioning assets to meet the threat, significantly diminishes the uncertainty in the task.

The low degree of task-related uncertainty is also a result of the few subtasks that are associated with a screen. The three subtasks of the screening force are:

- Gain and maintain contact with the enemy to provide early warning to the task force main body;
- Destroy or repel enemy reconnaissance units within the capabilities of the screening force; and
- Impede and harass enemy main force units with indirect fire. [Ref. 32:p. 4]

These subtasks remain constant for the screen task no matter what the enemy situation, task force mission, or task environment. The

small number of recurring subtasks establishes a minimal amount of uncertainty that the commander and staff must consider when organizing a command and control structure for the screen mission.

2. Screen Task Environment

At first glance, it would seem that the screen task environment is somewhat dynamic. Like the reconnaissance environment, variations in the weather can cause drastic changes in the task environment. Poor weather conditions can actually create an advantage for the screening force by reducing the trafficability of enemy reconnaissance assets and thereby limiting them to more restrictive avenues of approach. Changes in the weather can become almost negligible to the screening force because it can often acquire and engage enemy reconnaissance elements from static positions. The screening force is able to reduce the environmental uncertainty caused by weather effects through its ability to reconnoiter the area of operations for the best maneuver routes. Reconnaissance of the area allows the screening force to locate and use the most trafficable routes and avoid those areas that are potentially hazardous to maneuver.

The considerable number of assets that the commander can expect the enemy to devote to reconnaissance creates a potentially hostile environment [Ref. 32:pp. 5-6]. However, the task force commander is capable of effectively dealing with these assets by placing surveillance elements in well-hidden positions while supporting them with responsive artillery fires. Additionally, establishing a reaction force of sufficient

strength and firepower effectively negates the combat reconnaissance patrols of the enemy reconnaissance effort.

Thus, environmental uncertainty is minimal due to the task force commander's ability to sufficiently cope with the changes in the environment as well as with a hostile enemy.

3. Inter-Unit Task Interdependence

Inter-unit task interdependence within the screen task exists as a result of the relationship between the surveillance force and the reaction force. The reaction force depends on surveillance assets to provide information as to the location, composition, and activity of enemy reconnaissance. The surveillance force, limited in firepower and restricted by the commander's need to preserve it for future tasks, directs the reaction force into positions from which it is capable of killing the enemy reconnaissance. The uncertainty that emanates from this relationship creates a need for increased information sharing and mutual problem solving between the two forces. The commander must establish a coordinating mechanism that eliminates the uncertainty and provides a responsive structure for either information sharing or mutual adjustment.

4. Technology

Screen task variety is high due to the number of unforeseen problems that arise during task planning and execution. The static nature of the screening force, combined with the short distance between it and the task force support mechanisms and facilities (generally between five and seven kilometers from the screen), reduces task uncertainty to a manageable level.

The limited number of recurring subtasks (essentially surveillance and destruction of enemy reconnaissance) enable the commander and staff to clearly define the task force procedures that are essential when executing the screen task. The analyzability and low complexity of the task minimizes uncertainty and allows the commander to standardize the procedures used by the task force when planning and executing the screen mission.

The uncertainty associated with the screen mission is low, but some mutual adjustment is required to effectively coordinate the actions of the surveillance elements and the reaction force. The well-defined subtasks are suitable to surveillance assets and combat forces within the task force. Matching a specific subtask to elements within the task force that are functionally designed to accomplish the subtask (scouts to conduct surveillance, tanks and IFVs to destroy the enemy) reduces uncertainty, minimizes information processing, and enables the commander to predetermine, or standardize, the processes and functions required to accomplish the screen task (see Figure 6 in Chapter IV). The structure subsequently revolves around the functional capabilities (surveillance and combat power) of the various elements charged with executing the screen task.

C. COUNTERRECONNAISSANCE SCREEN COMMAND AND CONTROL ARCHITECTURE

The low task uncertainty and the ability of the commander to standardize work processes of the screening force favors a structure that is organized around the functional capabilities of task force assets. To

execute the task, the commander organizes the screening force around a surveillance force and a reaction force. The inter-unit task interdependence between the two forces requires a coordinating mechanism that facilitates either mutual problem solving or commonly distributed information.

1. Screening Force Organization

The screening force (Figure 14) is responsible for acquiring and killing enemy reconnaissance elements. The surveillance force (consisting of the scout platoon and the GSR section) detects enemy reconnaissance efforts by employing multiple security elements and systems throughout the depth of the task force area of operations [Ref. 11:p. 3]. The reaction force—in this case a mechanized infantry team (a company-level organization consisting of two mechanized infantry platoons and one tank platoon)—uses the information provided by the surveillance force to quickly locate and destroy the enemy reconnaissance elements [Ref. 18:p. 2]. Using an entire team (essentially one-fourth of the task force combat power) instead of one or two platoons enables the reaction force to use its organic headquarters and thus facilitate command and control [Ref. 32:p. 8].

The screening force receives direction from the task force commander and S-3. The commander's intent and the S-3's counterreconnaissance plan designate specific collection tasks for the screening force. The commander's intent and the counterreconnaissance plan supplement the standardized procedures that the screening force uses to

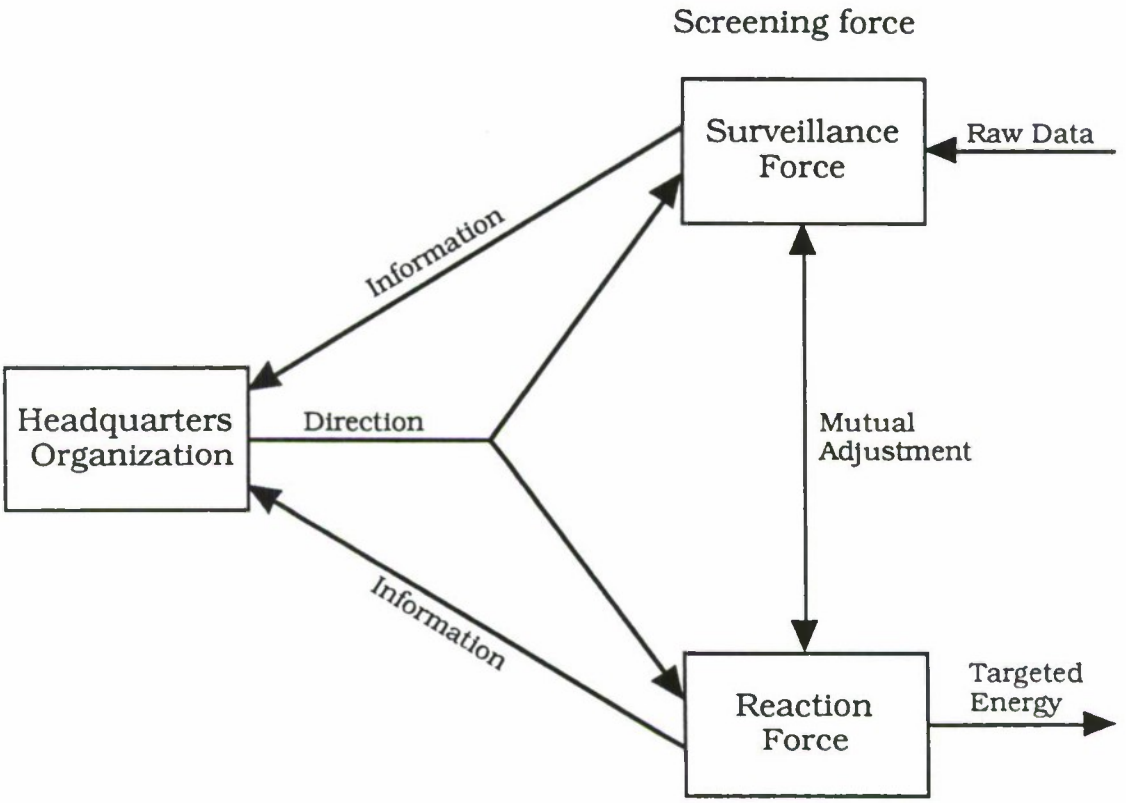

Figure 14. **Screening Force Organization**

accomplish the screen task. The commander and the S-3 direct and control the operation and ensure that the actions of the surveillance force, the reaction force, and supporting artillery are synchronized [Ref. 6:p. 13].

The task force commander uses standardization and mutual adjustment to control the efforts of the screening force. The commander can quickly react to environmental and mission changes by standardizing the procedures that the task force uses when conducting a screen. The commander establishes standardization within the task force by

consistently using the same elements (e.g., the scouts and a mechanized infantry team) to execute the few habitual subtasks of the screen. This practice leads to familiarity among the various elements of the screening force, not only with their respective subtask but with each other as well.

There are, however, some problems in relying totally on standardization to coordinate the efforts of the screening force. As the enemy reconnaissance units attempt to infiltrate the task force sector, the scouts identify them and report their location to the headquarters and the reaction force. The scouts normally harass and impede the progress of the enemy with artillery fire while the reaction force moves into positions from which it can engage and destroy the enemy [Ref. 6:p. 14]. This means that the reaction force obtains information about the location and strength of the enemy simply by monitoring the scouts' reports to the headquarters on the task force command frequency (Figure 15). The reaction force uses the information to locate and engage the enemy. In this simplified case, the command and control architecture does not require mutual adjustment to facilitate mutual problem solving among the two elements of the screening force.

Unfortunately, several conditions exist on the battlefield that necessitate the use of mutual adjustment between the surveillance force and the reaction force. The need to continuously update the location of friendly surveillance elements as a means of preventing fratricide is one condition which would require mutual adjustment between the two forces in the screening force. The possibility also exists that, despite the

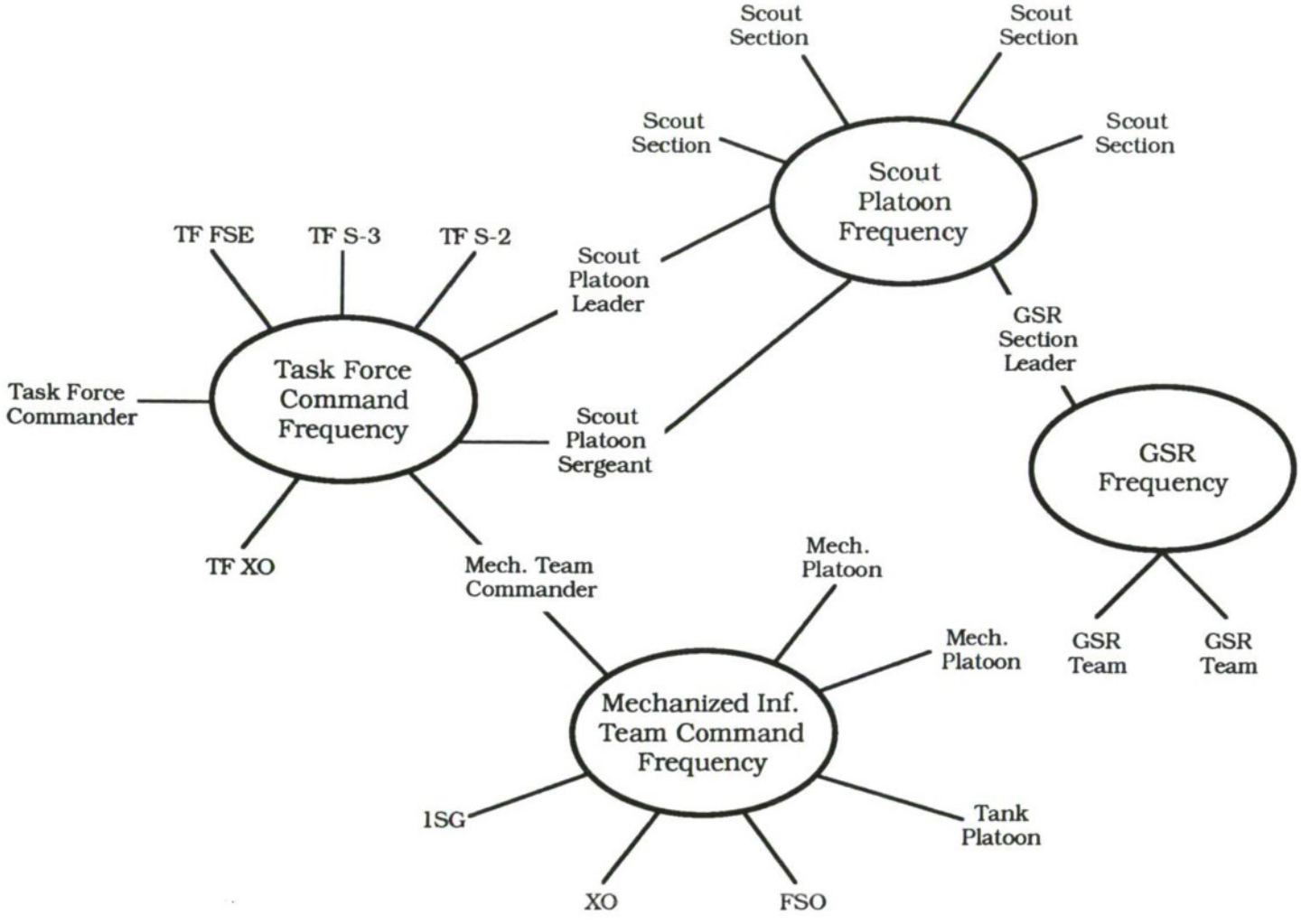

Figure 15. **Communications Network for Task Force Screen**

depth of overlapping observation by surveillance assets, contact with the enemy reconnaissance elements could be lost. This would require the scouts, because of their static positions, to hand over to the reaction force the task of reestablishing contact with the enemy. Additionally, unexpected losses or maintenance difficulties (task variety) within the surveillance force may require the reaction force to temporarily assist in conducting observation of the task force sector in excess of their normal observation requirements. Mutual adjustment between the two forces overcomes each of these unexpected events.

It might seem practical to have the screening force under the control of a single commander [Ref. 6:p. 12]. This would seem to facilitate command and control through direct supervision. However, the habitual relationship that standardization provides between the surveillance force, the reaction force, and their respective subtasks eliminates the need for a "screening force commander." The addition of a single commander creates an unnecessary layer of bureaucracy between the task force commander and the scout platoon leader. The additional level of command created by this decision would require the platoon leader to communicate on three radio frequencies at once (task force command, scout platoon, and screening force). The task force headquarters is a suitable headquarters which can provide command and control for the screening force [Ref. 32:p. 7].

a. Surveillance Force

The surveillance force (Figure 16) is under the direction of the scout platoon leader. The surveillance force is responsible for establishing observation posts throughout the task force area of operations. While the surveillance force should avoid direct-fire engagements with the enemy, it is capable of directing artillery against both mounted and dismounted enemy reconnaissance assets.

(1) Individual Positions. The individual positions in the surveillance force are the scout platoon and the GSR section. The scout platoon consists of the platoon headquarters (platoon leader and platoon sergeant) and four scout sections (two HMMWVs, one motorcycle, and six scouts each). The scout platoon and the GSR section conduct surveillance and operate observation posts in order to gather raw data about the enemy reconnaissance efforts. The size of the force designated to perform this subtask provides redundancy in the surveillance effort as well as the capability to establish overlapping fields of observation throughout the task force area [Ref. 33:pp. 35–36].

The scout platoon leader provides command and control for the surveillance force, with the platoon sergeant assisting as necessary. The GSR section leader directs the surveillance efforts of his teams in accordance with guidance from the scout platoon leader and that contained in the task force counterreconnaissance plan.

(2) Information Processing. The GSR and scout section leaders use standardized reporting procedures to convert observations

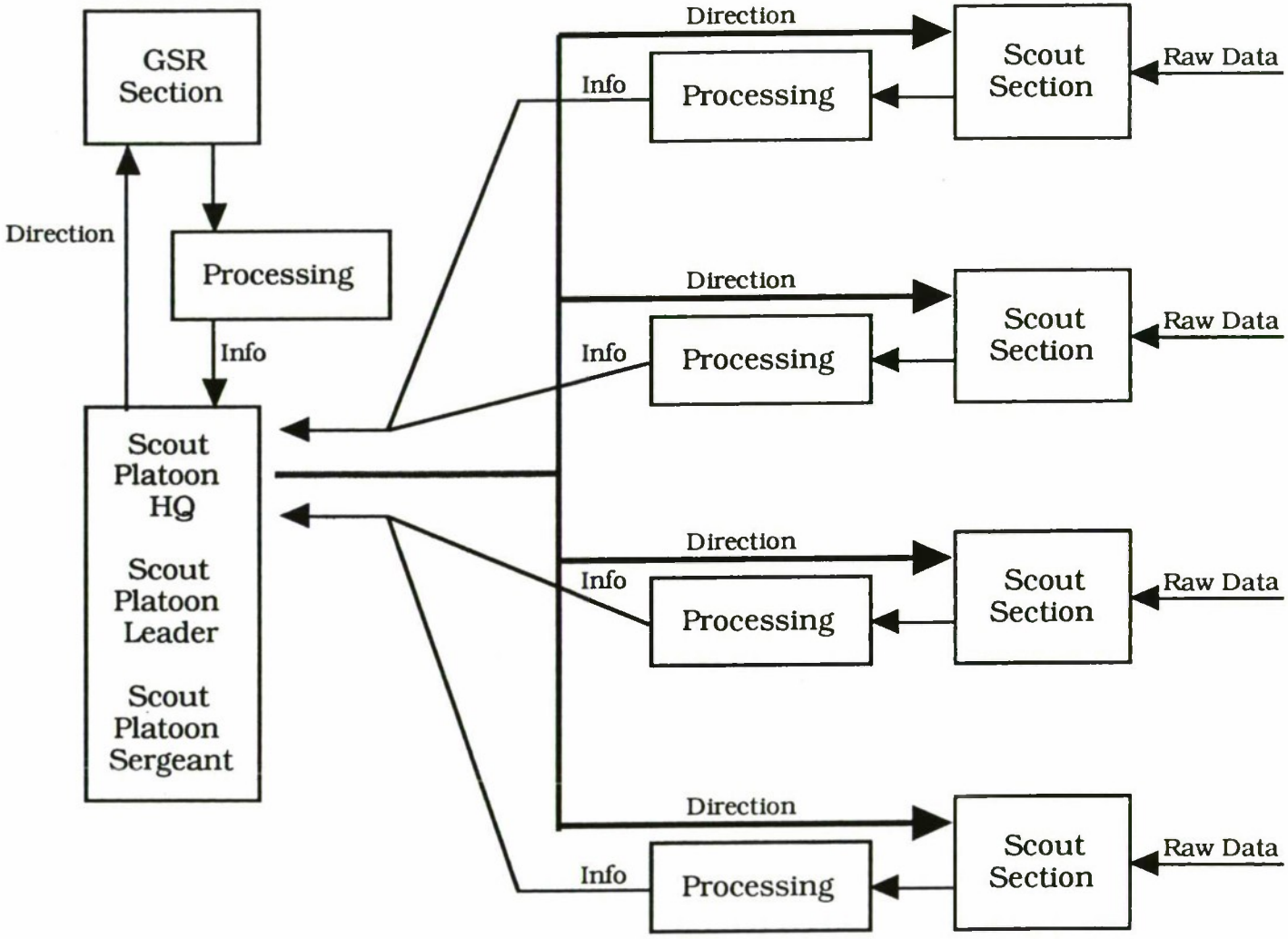

Figure 16. **Surveillance Force**

(raw data) from their team/squads into information. The section leaders report the information to the scout platoon leader on the scout platoon frequency. The platoon leader collects (processes) the observations of all sections and sends the information to the task force headquarters on the task force command frequency [Ref. 6:p. 13].

(3) Decision Makers. The primary decision maker for the surveillance force is the scout platoon leader. The platoon leader selects the general location of the force's observation posts so that they "have long range observation along the high speed avenues of approach" and provide depth throughout the sector [Ref. 15:p. 4-25]. The platoon leader ensures that the surveillance force operates according to standardized procedures, the commander's intent, and the task force counterreconnaissance plan.

The platoon sergeant and the scout section leaders act as secondary decision makers. The scout platoon sergeant assists the platoon leader in the command and control of the surveillance force. The platoon sergeant and the section leaders have the authority to make decisions as long as they abide by the commander's intent and the platoon leader's guidance.

(4) Coordinating Mechanisms. The need for minimal information processing due to the low task uncertainty of the screen task enables the task force commander to standardize the subtask procedures of the surveillance force (see Figure 6). By operating on the same transmission frequency, the elements of the surveillance force are able to share commonly distributed information. This information sharing gives

each scout and GSR the location of any observed enemy reconnaissance assets as well as the current status of surveillance force elements. The scout platoon leader provides direct supervision to the force when enemy actions mandate deviation from established procedures or the counterreconnaissance plan.

b. Reaction Force

The reaction force (Figure 17), a mechanized infantry team, is under the command and control of the team commander. The team uses information provided by the surveillance force to locate and destroy enemy reconnaissance assets. The team is capable of using direct and indirect fires to engage both mounted and dismounted enemy reconnaissance elements. Additionally, the team uses the optical sights of its weapon systems to conduct limited surveillance of the area of operations.

(1) Individual Positions. The individual positions in the reaction force are the team commander, executive officer, first sergeant, Fire Support Team (one M113 APC), two mechanized infantry platoons (four M2 Infantry Fighting Vehicles each), and one tank platoon (four M1 Abrams tanks). The team commander and executive officer provide command and control to the team. The first sergeant is responsible for synchronizing the logistical and administrative support elements of the team. The FIST, under the direction of the team Fire Support Officer (FSO), communicates with the task force FSO and requests indirect fires in support of the reaction force artillery plan and calls for fire from the team's own forward observers (one in each platoon). The mechanized

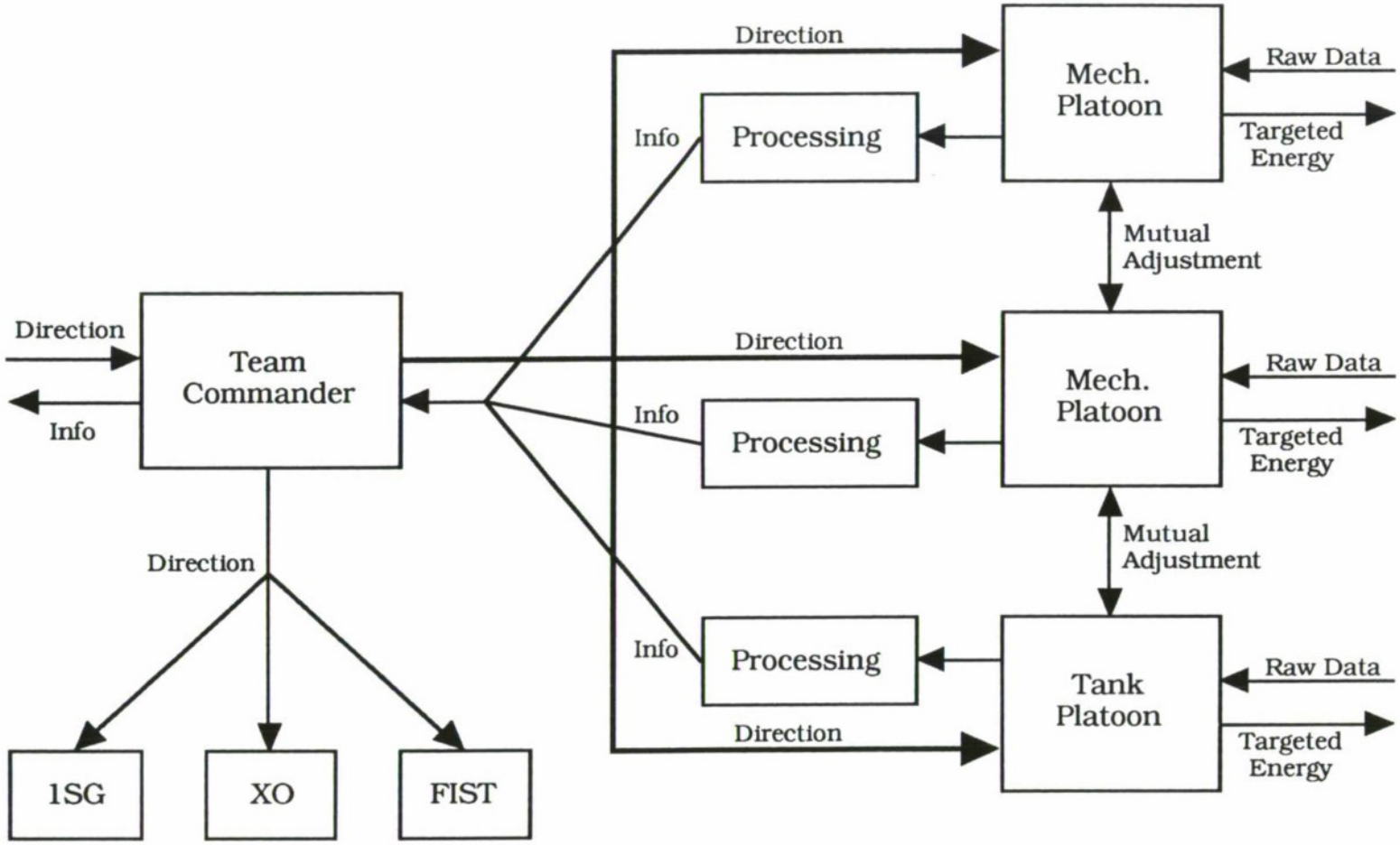

Figure 17. **Reaction Force**

infantry platoons and the tank platoon conduct battle drills to engage and destroy enemy reconnaissance assets. Each platoon has the capability to conduct day or night observation of their task force sector of responsibility.

(2) Information Processing. The infantry and tank platoon leaders convert any raw data gathered by their individual elements into reports (information). The reports are sent to the team commander, who refines the information and sends it to the task force headquarters on the task force command frequency. The XO is capable of performing this function at the commander's request. The FIST gathers raw data and processes it into reports that are sent to the team commander on the team command frequency. The team FSO also sends the information using digital communications to the task force FSO on the fire support frequency.

(3) Decision Makers. The primary decision maker for the reaction force is the team commander. The team commander directs the elements of the force against observed enemy reconnaissance elements using established procedures (battle drills). The team commander is responsible for ensuring that the team acts in accordance with standardized procedures, the commander's intent, and the task force counterreconnaissance plan. The team XO, as the designated second in command (2IC), assists the commander in accordance with established procedures and at the commander's request. The platoon leaders, the team FSO, and the first sergeant act as secondary decision makers. The platoon leaders direct the actions of their respective platoons in accordance with

established procedures and the instructions of the team commander. The FSO and first sergeant are authorized to make decisions within their areas of responsibility that assist in the support and synchronization of the team.

(4) Coordinating Mechanisms. The team commander provides direction to the platoon leaders, the FSO, the XO, and the first sergeant. The commander determines which elements (either the assets available to the FSO or those in the three platoons) are to engage the enemy based on information provided by the surveillance force. Either standardized procedures or direction from higher headquarters determines the type of fires, direct or indirect, that the team commander will use against the enemy reconnaissance. Mutual adjustment exists between the platoons in order to reduce the possibility of fratricide as well as to coordinate the engagement of the enemy. Mutual adjustment is especially important in situations where the team commander directs more than one platoon to engage the enemy.

2. Headquarters Organization

The headquarters organization (Figure 18) provides the screening force with direction for the execution of the screen task. Direction to the screening force is in the form of the commander's intent and the S-3's counterreconnaissance plan, both of which supplement the standard procedures that the task force uses when conducting a screen. The screening force provides the headquarters with information that the headquarters staff elements process into reports for their counterparts at higher headquarters.

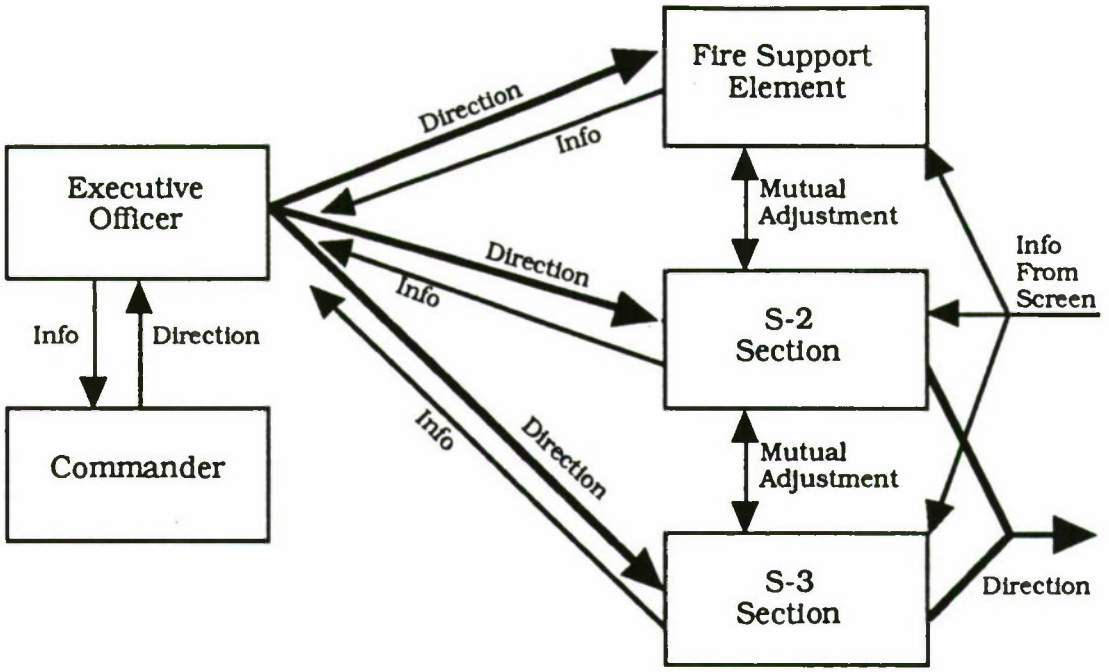

Figure 18. **Headquarters Organization**

a. Individual Positions

The S-2 and S-3 staff elements are the principal individual positions within the headquarters organization during the screen task. The S-2 conducts IPB for the task force sector so that the commander can use it while developing a tentative course of action for the upcoming task force mission and then establish his Priority Intelligence Requirements and Information Requirements (PIR/IR) [Ref. 6:p. 10]. The S-2 uses the commander's PIR/IR to prepare the task force surveillance plan. The S-3 uses the surveillance plan to complement the standard procedures that the task force uses when conducting a screen. The S-3 issues a counterreconnaissance plan that provides all units of the task force with specific information collection and surveillance requirements. The

specific requirements complement the standard information needs of the task force commander and staff.

The task force Fire Support Element (FSE) ensures that the screening force is provided with responsive artillery, mortar, and close air fire support. The task force FSO uses the S-2's IPB to develop a fire support plan that adequately covers the area in which the screening force must operate. The FSO ensures that supporting artillery batteries are able to fire at least three to five kilometers forward of the screening force [Ref. 6:p. 12].

b. Information Processing

The S-2 uses the observations of the screening force to identify the elements of the enemy reconnaissance effort. The S-2 uses the information provided by the screen to determine the possible location of the enemy force's main body and the avenue of approach that the enemy is most likely to use when attacking. The S-2 then reports his conclusions to both the task force commander and the higher headquarters.

The S-3 uses information from the screening force to determine whether any enemy reconnaissance elements have infiltrated through gaps that might exist in the task force screen. The S-3 monitors reports from the screening force to determine whether it is necessary to direct other elements of the task force to assist in the destruction of the enemy reconnaissance. Both the S-3 and S-2 are responsible for forwarding reports from the screening force to the higher headquarters.

c. Decision Makers

As in the reconnaissance task, the task force commander is the primary decision maker and the XO, S-2, S-3, and FSO are secondary decision makers. The commander works closely with the S-3 to direct the effort of the screening force against the enemy commander's reconnaissance effort. The commander determines the PIR/IR for the screening force. The commander directs the screening force to maneuver along preplanned routes to positions behind the task force prior to the arrival of the enemy main body.

The task force XO supervises the actions of the staff during the screen mission. As the 2IC, the XO can make decisions that affect the coordination of staff support to the screening force. He also has some decision-making authority within each staff section. Within respective sections, each staff officer is responsible for making decisions that provide support to the screening force as it executes the screen task.

d. Coordinating Mechanisms

Mutual adjustment exists among the staff elements to ensure that they coordinate their support to the screening force (interunit task interdependence). The FSO develops a fire support plan for the screening force based on the S-2's IPB and the commander's intent [Ref. 6:p. 12]. The S-3 and FSO coordinate to determine when it is appropriate to use indirect fires against the enemy's reconnaissance elements. Coordination is necessary to preclude the wasting of these resources as well as the possibility of fratricide.

The S-3 uses the S-2's IPB and the commander's PIR/IR to finalize the counterreconnaissance plan and determine the locations of the surveillance force's observation posts and surveillance sites as well as the reaction force's IFVs and tanks. The S-3 must ensure that there are enough assets to fulfill the commander's intent and PIR/IR. The S-3 works with the task force XO to reduce variety by ensuring that task force support assets are positioned well forward to facilitate resupply of the screening force as well as casualty, equipment, and prisoner of war evacuation.

D. SUMMARY

Counterreconnaissance is not a mission that the task force commander can interpret in order to determine its uncertainty and thus an appropriate corresponding command and control structure. Instead, it is an accumulation of many tasks of which the screen is the most important. Analysis of the screen mission reveals a task that is relatively routine, requires minimal information processing capacity, has a stable environment, and is subsequently low in uncertainty. The task force is able to standardize the task processes around functional requirements (surveillance and killing of enemy reconnaissance) because of task analyzability and low uncertainty.

The commander combines elements of the task force that are capable of fulfilling the functional requirements of the screen task into a single force—the screening force. A dedicated surveillance force and reaction force are responsible for conducting standardized operations that enable the task force to defeat the enemy reconnaissance effort. The surveillance

force and reaction force coordinate the execution of the screen through shared information and mutual adjustment.

The task force headquarters organization provides direction to the screening force. The commander's intent provides specific guidance to the screening force, and the S-3 uses the intent to develop a counterreconnaissance plan for the task force. The plan should only complement the standard procedures that the task force uses when executing a screen. The staff must coordinate through mutual adjustment to ensure that the supporting elements of the task force assist the screening force as necessary.

VI. CONCLUSION

A commander who can concentrate superior combat power at decisive times and places is often the winner of battles. While there is no simple formula for success on the battlefield, the extent of information known about the enemy and area of operations has long been recognized as a critical factor in combat operations at any level. A commander conducts reconnaissance in order to obtain information about the enemy and area of operations. This information enables him to successfully direct the combat power of his forces against enemy vulnerabilities and along the most suitable maneuver routes.

A task force performs counterreconnaissance to deny this type of information to the enemy commander. The task force screen is the primary instrument available to the task force commander to deny enemy reconnaissance forces the ability to gather information about the task force. The screening force gathers information about the enemy reconnaissance forces and uses this information to destroy the enemy forces before they can enter the task force area of operations.

Timely and accurate information is essential at the tactical level of operations. This is especially evident within the U.S. Army armor and mechanized infantry task force. The speed and maneuverability of mechanized forces require the task force to gather, analyze, and disseminate information (information processing) as quickly and efficiently as possible. The task force must have a command and control structure

that facilitates organizational information processing and coordinates task force elements as they conduct reconnaissance or counterreconnaissance.

The task force commander and staff must design a command and control structure that supports the commander's decision-making process and reduces the uncertainty that they experience as the task force conducts reconnaissance and counterreconnaissance. The commander and staff conduct a task analysis of reconnaissance to determine where and to what degree uncertainty exists. The task analysis analyzes the task in terms of its characteristics, environment, inter-unit interdependence, and technology. The uncertainty that exists in each area determines how the commander will structure and coordinate the forces that he intends to devote to reconnaissance.

Reconnaissance is a task that is high in uncertainty. Unanalyzable technology, the need for significant information processing capacity, and high inter-unit task interdependence require a command and control structure that uses direct supervision, mutual adjustment, and common information sharing to coordinate the reconnaissance effort. The commander and staff assemble task force assets that are most suitable to conduct specific reconnaissance subtasks due to high task complexity and variety. By limiting the number and scope of reconnaissance subtasks that certain task force elements must accomplish and by promoting mutual problem solving through mutual adjustment, the commander and staff create a structure that reduces uncertainty to a manageable level and improves the reconnaissance effort.

Unlike reconnaissance, counterreconnaissance is not a task for which the commander and staff can design a command and control structure. Counterreconnaissance is the aggregation of all measures taken by the task force to defeat the enemy reconnaissance effort. The task force screen, the most important aspect of counterreconnaissance, is a task that the commander and staff can analyze in order to determine its associated degree of uncertainty. A stable environment and low task variety portray the low uncertainty of the screen task.

The screen task is typically reduced to two manageable subtasks: detecting and destroying the enemy reconnaissance elements. Consequently, the screen task is relatively routine and requires minimal information-processing capacity. The commander and staff configure the screening force in accordance with its functional subtasks— surveillance and combating of enemy reconnaissance elements. A surveillance force detects enemy reconnaissance assets and provides the enemy location(s) to the task force headquarters and the reaction force on a common radio frequency. The reaction force uses the information from the surveillance force to locate and destroy the enemy reconnaissance elements.

Standardization is suitable as a means for coordinating the efforts of the surveillance and reaction forces due to low task complexity and information-processing requirements. While standardization and commonly shared information adequately coordinate the effort of the two forces, some mutual adjustment may be necessary.

The function of the task force headquarters is essentially the same for both reconnaissance and counterreconnaissance. The task force

headquarters provides direction to the reconnaissance and screening forces through the commander's intent, rules of engagement, and plans and orders. The headquarters is responsible for synchronizing the actions of the task force elements that support the reconnaissance and screening forces.

As the headquarters receives information from the reconnaissance and screening forces, the staff sections must interact to ensure that the surveillance, maneuver, and supporting indirect fire elements of the task force are synchronized. Mutual adjustment between the task force S-2 and S-3 allow them to confirm threat estimates and formulate schemes of maneuver that take into consideration enemy dispositions, enemy and friendly routes of maneuver, and the effect of terrain and weather on operations. Using mutual adjustment, the S-2, S-3, and FSO coordinate to ensure that supporting indirect fires can effectively fire well forward of reconnaissance or screening forces. The S-2 and FSO must also coordinate to prevent the possibility of fratricide from indirect fires by establishing restricted fire areas for reconnaissance and screening forces. The S-3 and FSO use the S-2's Intelligence Preparation of the Battlefield to develop initial operations plans for upcoming operations.

The task force executive officer and commander provide direction to the staff during reconnaissance and, to a lesser degree, counterreconnaissance. The executive officer supervises the actions of the entire staff to ensure that the reconnaissance and screening forces receive the necessary administrative, operational, and logistical support. As the second in command of the task force and by virtue of his location in the task

force headquarters, the executive officer can make decisions for elements within the task force headquarters organization. It is the commander, however, who provides all task force elements with planning guidance, tactical intent, and operational maneuver instructions. The commander is ultimately responsible for determining the proper combination of task force assets and coordinating mechanisms necessary to execute the task force reconnaissance and screen tasks. The commander must work with his staff to determine a command and control architecture for the task force that maximizes information processing capacity within the unit and enables him to use the processed information to successfully direct the combat power of the task force against the enemy.

The command and control architectures in this thesis are a result of the independent analysis of two very dissimilar tasks. The author uses his intuition, training, and research to design a distinct architecture for reconnaissance and counterreconnaissance. Future research should concentrate on calculating the actual number of surveillance and combat elements of the task force that would maximize information gathering and processing capacity while retaining maximum combat power for the task force mission. It might be possible to model and analyze various architectures using different combinations of scouts, GSRs, engineers, and combat vehicles. This would require the researcher to determine measures of effectiveness that quantify the uncertainty associated with task variables (task characteristics, task environment, inter-unit task interdependence, and technology) and coordinating mechanisms. The

scope of this research is applicable to counterreconnaissance and reconnaissance alike.

The reliance of the elements in the two architectures on radio communications creates another area of concern that requires further research. When conducting the reconnaissance and counterreconnaissance tasks, the task force uses radio networks that are subject to saturation from excessive and redundant information processing as well as from too many elements operating on the same frequency. It is also quite possible that information delays due to enemy countermeasures or the time required to analyze and process raw data into information may lead to misleading or misinterpreted information by the task force commander and staff. Computer simulations or PERT networks can determine the feasibility of various radio network configurations. Data from training exercises at the National Training Center might provide a realistic database that could be used for determining the vulnerability of the command and control architecture to communication problems.

Lastly, many of the factors that are used in a task analysis are also used in the Commander's Estimate of the Situation. The Commander's Estimate of the Situation determines the effects of several mission factors, thus enabling the commander to determine a course of action that is best suited to the characteristics of the mission. Many of the principles of task analysis might be incorporated into the Commander's Estimate of the Situation in order to provide a more comprehensive analysis of the area of operations and the enemy. With this additional analysis, the

commander and staff might better organize unit assets for the upcoming mission.

LIST OF REFERENCES

1. Keegan, John, *The Mask of Command*, Viking Penguin, 1987.

2. Clark, Champ, *Gettysburg*, Time-Life Books, 1985.

3. *Department of Defense Dictionary of Military and Associated Terms*, JCS Publication 1, Joint Chiefs of Staff, 1 June 1987.

4. The RAND Corporation, *Applying the National Training Center Experience: Tactical Reconniassance*, by Martin Goldsmith with James Hodges, October 1987.

5. *Staff Action-Decision Paper on 24th ID Scout Platoon CEP After Action Report*, presented by the Armor and Cavalry Tactics Division, Command and Staff Department, U.S. Army Armor School, Fort Knox, KY, to the Commandant, U.S. Army Armor School, Fort Knox, KY, 19 September 1989.

6. Rosenberger, MAJ John D., *An Assessment of Reconnaissance and Counterreconnaissance at the National Training Center*, Fort Knox, KY, 1987.

7. U.S. Army Combined Arms Services and Staff School, *Combined Arms Operations Volume 2*, Fort Leavenworth, KS, February 1987.

8. Wilberforce, Archibald, *The Great Battles of All Nations*, vol. 1, Peter Fenlon Collier and Son, 1899.

9. Chandler, David, *Battles of Europe*, vol. 1, Hugh Evelyn Ltd., 1965.

10. Martin, 1LT Steven J., "Custer Didn't Listen," *Military Intelligence Magazine*, pp. 15–20, April–June 1989.

11. U.S. Army Center for Army Lessons Learned (CALL), *Spring Memorandum*, Fort Leavenworth, KS, Spring 1989.

12. U.S. Army National Training Center, *Commander's Memorandum*, Fort Irwin, CA, 20 November 1985.

13. U.S. Army, *Battalion Intelligence and Electronic Warfare Operations*, Field Manual 34-80, April 1986.

14. Hall, LTC Wayne M., "Principles of Reconnaissance," *Military Intelligence Magazine*, pp. 9–14, April–June 1989.

15. U.S. Army, *Scout Platoon*, Field Manual 17-98, 7 October 1987.

16. U.S. Army, *The Tank and Mechanized Infantry Battalion Task Force*, Field Manual 71-2, September 1988.

17. U.S. Army, *Operational Terms and Symbols*, Field Manual 101-5-1, October 1985.

18. U.S. Army Combined Arms Training Activity, *NTC Lesson Learned*, Fort Leavenworth, KS, 1 May 1986.

19. U.S. Army Center for Army Lessons Learned, *Training Notes—NTC Tactics*, Fort Leavenworth, KS, 11 September, 1989.

20. United States Army Training Board White Paper 4-86, *Enhancement of Reconnaissance and Counterreconnaissance Techniques*, Fort Monroe, VA, 10 June 1986.

21. U.S. Army Armor Center and School Command and Staff Department, Cavalry Tactics Division, *Observation of Wheeled Scout Vehicles, Rotation 88-12*, NTC Observations, Fort Knox, KY, no date.

22. U.S. Army Armor Center and School Command and Staff Department, Cavalry Tactics Division, *Observation of Wheeled Scout Vehicles, Rotation 88-13*, NTC Observations, Fort Knox, KY, no date.

23. U.S. Army Armor Center and School Command and Staff Department, Cavalry Tactics Division, *Briefing Notes on 10 Vehicle Scout Platoon Configurations*, Fort Knox, KY, no date.

24. Marr, 1LT Patrick, and Kingsley, CW3 Daniel, "New Roles for Combat Motorcycles," *Armor Magazine*, pp. 33–36, September–October 1984.

25. Tushman, L., and Nadler, David A., "Information Processing as an Integrating Concept in Organizational Design," *Academy of Management Review*, pp. 613–624, July 1978.

26. Daft, Richard L., and Lengel, Robert H., "Organizational Information Requirements, Media Richness and Structural Design," *Management Science*, vol. 32, no. 5, pp. 554–571, May 1986.

27. Dess, Gregory G., and Beard, Donald W., "Dimensions of Organizational Task Environments," *Administrative Science Quarterly*, pp. 52–73, March 1984.

28. Jones, Carl R., *Concepts for Architectural Analysis*, paper prepared for course in Joint Command, Control, and Communications, Naval Postgraduate School, no date.

29. U.S. Army Training and Doctrine Command, *TRADOC Reconnaissance, Surveillance, and Counterreconnaissance Assessment*, Fort Monroe, VA, no date.

30. U.S. Army Command and General Staff College, *Command and Control on the Airland Battlefield*, Field Circular 101-34, Fort Leavenworth, KS, June 1984.

31. Vandergriff, LT Donald E., "Scout Platoon; Offensive Reconnaissance," *Infantry Magazine*, pp. 15–17, September–October 1988.

32. U.S. Army Command and General Staff College, "The Scout Platoon in a Battalion/Task Force," course notes prepared for the Pre-Command Course, Fort Leavenworth, KS, 11 August 1988.

33. Ozolek, MAJ David J., "Counterreconnaissance," *Infantry Magazine*, pp. 34–37, September–October 1986.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, VA 22304-6145	2
2.	Library, Code 0142 Naval Postgraduate School Monterey, CA 93943-5002	2
3.	Superintendent C^3 Academic Group, Code 74 Naval Postgraduate School Monterey, CA 93943-5000	1
4.	Professor Carl R. Jones, Code CC Naval Postgraduate School Monterey, CA 93943-5000	1
5.	MAJ Victor Roeske, Code ORRo Naval Postgraduate School Monterey, CA 93943-5000	1
6.	Commander USCATA Attn: ATZL-TAL-N Fort Leavenworth, KS 66027-7000	1
7.	Commander USA CACDA Attn: ATZL-CAI-I Fort Leavenworth, KS 66027-5300	1
8.	Commandant U.S. Army Armor School Command and Staff Department Attn: ATSB-CS-ACTD 139 Fort Knox, KY 40121-5211	1

9. CPT James B. Henderson 1
8415 Crown Place
Alexandria, VA 22308

617-586